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CNC CHARLESTON
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DRAFT FINAL SITE ASSESSMENT REPOT HOBSON FUEL FARM VOLUME 1 OF 1 CNC
CHARLESTON SC
11/28/2000
ENSAFE

**DRAFT FINAL
HOBSON FUEL FARM
SITE ASSESSMENT REPORT
CNC CHARLESTON
NORTH CHARLESTON, SOUTH CAROLINA**

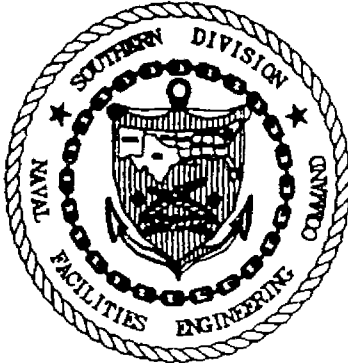


Volume I of I

**CTO-0144
Contract Number: N62467-89-D-0318**

Prepared for:

**Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina**



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**November 28, 2000
Revision: 0**

Release of this document requires prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina.

Code 1849 Current Workload

Charleston Naval Base Complex

1. Tetra Tech, NUS, is performing two assessments. The sites are AST M-82 in Zone C and AST 601 in Zone H. The fieldwork has been completed. AST 601 will need a CAP. AST M-82 will most likely be a Limited Assessment Report with recommendation for NFA. The final Assessment Report is due December 20th.
2. EnSafe is performing an assessment on the Hobson Fuel Farm Area. Three Letter Reports (Area 19, Area 20 and Hobson Fuel Farm) are due ASAP. This work is high priority due to the property being desired by a private company. The assessment must be completed in order for SCDHEC to approve the company's plans. *No ECD*
3. Underground Storage Tank 4 needs to be permanently closed. The award is scheduled for ~~1/15/2001~~ *100 gallon EVER GEN* ^{for tank closure} *3/3-*
4. Follow-up repairs on sinkholes in Zone H from former UST sites that were not compacted properly are scheduled to be awarded 1/15/2001.
5. J. A. Jones is submitting documents on a continuous basis to SCDHEC. The Navy is reviewing these documents simultaneously. These documents are Monitoring Plans, Corrective Action Plans, etc.
6. J. A. Jones still is required to perform assessments in Zone K (Naval Annex). I have asked them for a schedule of events including deliverables and fieldwork.

Charleston Naval Weapons Station

1. CH2Mhill is completing CTO 10, which includes closing out wells at Facility 350 and 869, and monthly monitoring at Facility 864 for six months.

MCRD Parris Island

1. Tetra Tech is performing Monitoring Natural Attenuation at Facility 850 (UST 000001) and the AVGAS pipeline (UST 000002). The reports are due at the end of January.
2. Tetra Tech is performing an assessment at the Depot Gas Station and Facility 4022. Facility 4022 is a Standard Limited Assessment with recommendation for monitoring. I have commented on the draft report for Facility 4022 and I am waiting for the final. The assessment report for the Depot Gas Station is being

UST/AST	DESIGNATION	ZONE	Date sent to DHEC
UST	191NW	A	8/31/2000
UST	O	B	8/31/2000
UST	S-1	B	8/31/2000
UST	S-2	B	8/31/2000
UST	790	C	8/31/2000
UST	NH 1137-2	C	8/31/2000
UST	Site 30 NH 46-5	C	8/31/2000
UST	242	F	8/31/2000
UST	145	G	12/20/2000
UST	691	H	
UST	NS 551A	H	11/17/2000 sent 10-30-00
UST	NS 551B	H	11/17/2000 sent 10-30-00
UST	NS 29A	I	12/1/2000
AST	177	E	10/30/2000 submitted on 10/17/00
UST	Site 29 NH 46	D	12/20/2000
UST	1175A	F	12/20/2000
UST	1175B	F	12/20/2000
UST	1175C	F	12/20/2000
UST	1346A-H	F	12/20/2000
AST	3939	G	12/20/2000
UST	121	G	12/20/2000
UST	648	H	12/20/2000
UST	642B	H	12/20/2000

UST/AST	DESIGNATION	ZONE	Date sent to DHEC
UST	NS 53A	H	11/22/2000
UST	NS 53B	H	11/22/2000
UST	NS 200	I	12/20/2000
UST	NS 25A	I	11/22/2000
UST	3A	J	11/22/2000
AST	FB221-3	H	
UST	221-1	E	10/30/2000
AST	501	H	12/20/2000
UST	6A	E	12/1/2000
UST	6B	E	12/1/2000
UST	241	F	12/1/2000
UST	224	G	12/1/2000
UST	553	H	12/1/2000
UST	B-42	G	8/31/2000
UST	B	B	completed
UST	C	B	completed
UST	NH02-2	C	completed
UST	NH 02-1	C	completed
AST	590A-00	E	completed
UST	590A-2	E	completed
UST	240	F	completed
UST	1346	F	completed
AST	NS 71	H	completed
AST	NS 73-2	H	completed
UST	547	H	completed
UST	550	H	completed
UST	554	H	completed
UST	555	H	completed
UST	557-2	H	completed
UST	NS 75-1	H	completed
UST	561-2	I	completed
AST	2490	F	completed

UST/AST	DESIGNATION	ZONE	Date sent to DHEC
AST	75-1A	K	12/16/2000
AST	231-52	K	12/15/2000

AST	25-AC	A	12/15/2000
AST	25-445	K	12/15/2000
AST	25-48	K	12/15/2000
AST	25-5	F	12/15/2000
XFER	25-ALU 175	H	12/15/2000
XFER	ADC 605	G	12/15/2000
XFER	ADC 650	H	12/15/2000
XFER	ADC 660	H	12/15/2000
XFER	ADC 682	H	12/15/2000
XFER	ADC 575/576 577, 575-2A, 3-1, 4-1	I	12/15/2000

Further Modeling	4
CAP-Intensive	12
CAP Active (J.V)	9
CAP Active (B.C)	2
Possible NFA/ more monitoring	1
Not categorized	2
Start Assessment from beginning	6
Start Assessment from DETe data	5
NFA	16
CAP Completed	
Total amount of Sites	58

ENSAFE**FAX**

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From: Todd Haverkost

Date: 12-6-00

Fax to Number: _____

Number of Pages: 17

Remarks:

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2.0 PREVIOUS INVESTIGATIONS

2.1 ESE Assessment

Environmental assessment of the HFF area began in 1986 with the initial site characterization performed by ESE, Inc. ESE sampled soil and shallow groundwater at the site and nearby surface water and sediment. ESE found contamination to a depth of eight feet below ground surface (bgs) over a 48,000 square-foot area where the former tanks 3900G and 3900H stood. Soil and groundwater samples were analyzed for TPH, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). TPH concentrations in soil ranged from 146 to 7,280 milligrams per kilogram (mg/kg); while groundwater TPH detections ranged from 341 to 130,000 micrograms per liter ($\mu\text{g/L}$). No VOCs were detected in soil or groundwater. Subsequent groundwater sampling by ESE identified PAHs, including some ^{chemicals of concern} Risk-based Screening Level (RBSL) constituents (KEMRON, 1990).

2.2 KEMRON Assessment/Remedial Activities

In 1990, KEMRON conducted further study of the HFF area to more closely determine the horizontal and vertical distribution of contamination in the vicinity of the former 3900G and 3900H. Soil analyses included TPH and VOCs, while groundwater samples were analyzed for TPH, VOCs and PAHs. The KEMRON study detected TPH and PAHs, and determined that the horizontal extent of contamination around 3900G and 3900H was smaller than the area originally identified by ESE. The vertical extent was also further refined. KEMRON identified impacted soil from two to ten feet bgs. Resampling of site monitoring wells by KEMRON revealed much lower TPH and PAH concentrations than was originally reported by ESE, indicating a lesser impact to groundwater than was previously observed. No VOCs were detected in this follow-on sampling.

From late 1991 to early 1992, after the demolition of tanks 3900G and 3900H and prior to the construction of newer tanks 3916 and 3917, a partially successful attempt at land farming was conducted by KEMRON. This effort was hampered by severe seasonal rainfall and was suspended when construction began on the new tanks (KEMRON, February 1992). Although limited soil

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removals were reportedly performed in the areas of these tanks, this was not documented in either of the KEMRON documents reviewed (KEMRON, 1990; KEMRON, 1992).

After the ESE and KEMRON investigations were conducted, several investigations were performed on areas adjacent to the HFF area, or in areas subject to IM action. These subsequent investigations focused on areas of specific petroleum related contamination associated with the FDS, or to confirm the removal of contaminated media associated with IMs.

2.3 S&ME TPH Survey

In May of 1992, S&ME, Inc. was retained by the Navy to conduct a soil TPH survey along a fuel supply line that parallels the south side of Hobson Avenue north of the HFF area. The purpose of the investigation was to determine if petroleum related contamination exists along the pipeline right-of-way. Soil samples for TPH analysis were collected at the soil-water interface, at approximately six-feet ft bgs. Two of four samples collected along the northeast and northwest sides of Building 98 revealed subsurface soil TPH concentrations of 690 and 1,000 mg/kg, respectively (TPH was not detected in the other two samples). S&ME's investigation report concluded that soil and groundwater were likely contaminated along this pipeline, and that appropriate abatement procedures should be followed during excavation and dewatering activities which were to accompany forthcoming repairs (S&ME, May 28, 1992).

2.4 NFESC SCAPS Study

In July of 1995, NFESC performed a site characterization within the AOC 626 (the Naval Supply Center Fuel Farm, including the HFF and surrounding area investigated under the FDS) area using a SCAPS. The objective of the NFESC's investigation was to define the extent of PAH contamination in the area outside the Fuel Farm proper. Confirmatory soil samples were also collected from depths coinciding with the suspected contamination areas. The SCAPS investigation, in conjunction with the confirmatory soil sampling, failed to reveal extensive petroleum contamination in soil (NFESC, April 1996).

*Were any of the
locations in the HFF
area of interest?*

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2.5 Facility 148 IM

was this really an IM?

In August of 1996, SPORTENVDETHASN performed an IM assessment and closure at Facility 148. The tank had been emptied and cleaned prior to the IM, and contained no residual fuel. Free product and petroleum contaminated soil were found throughout the excavation and demolition of Facility 148. Confirmatory samples were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) constituents, and PAHs. The area most impacted was associated with the piping to Building 98. The excavation was open until July 1997 when the tank pit was backfilled with clean soil (SPORTENVDETHASN, 1997). The FDS CAR (EnSafe, September 10, 1998), identified this area as FDS Area 19, requiring additional assessment due to the petroleum contamination observed during the Facility 148 IM activities.

Answered

How does this relate to HFF footprint? This area was identified as Area 19 in...

2.6 AOC 626 IM

In December of 1996, the SPORTENVDETHASN performed an IM at the southwest intersection of Hobson Avenue and Viaduct Road. The objective of this IM was to remove a portion of the 18-inch diameter abandoned fuel pipeline buried beneath the site (AOC 626), remove petroleum saturated soil found during the excavation, and install a free product recovery system, if required. Initial excavations during this removal action revealed heavily stained soil to five feet bgs, with free product leaching from the sides of the open excavation. A total of 229 linear feet of the 18-inch diameter fuel pipeline were removed from where the pipeline traversed beneath Viaduct Road. Approximately 450 cubic yards of petroleum contaminated soil were also removed during the IM. Confirmatory samples were collected from the bottom of the excavation pit and analyzed for TPH, BTEX, PAHs, and metals. A 200-foot, horizontal, perforated, polyvinyl chloride (PVC) free product recovery system was installed, along with PVC vertical standpipes for product recovery. Approximately 40,000 gallons of water mixed with oil was recovered from the site by this system (SPORTENVDETHASN, 1997). The FDS CAR (EnSafe, September 10, 1998), identified this area as FDS Area 20, requiring additional assessment due to the residual petroleum contamination observed during the pipeline IM activities.

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2.7 Zone L Subzone G Investigation

In 1997, EnSafe commenced the investigation of Zone L, to address possible releases from the CNC railroads, and storm water and sanitary sewer systems. Zone L, Subzone G included some sewer lines which traversed the HFF area. Twenty direct push technology (DPT) soil and 30 DPT groundwater samples were collected for VOCs, metals, and cyanide. Fourteen hand-auger soil borings advanced during the investigation and two monitoring wells installed at Subzone G were analyzed for VOCs, semivolatile organic compounds (SVOCs), metals, cyanide, chlorinated pesticides, and polychlorinated biphenyls (PCBs).

No mention of results where are these in relation to HFF

2.8 FDS Investigation

In 1996, EnSafe commenced investigation of the CNC FDS. The FDS investigations, performed subsequent to the ESE and KEMRON studies, focused on areas of petroleum related contamination associated with specific releases from the FDS and areas of likely release.

The FDS investigation performed by EnSafe attempted to identify system-wide problems associated with petroleum releases from previous operation of the CNC FDS. The FDS investigation encompassed all buried and above ground fuel pipelines within the CNC area, and storage tanks associated with this piping. The investigation covered areas both inside, adjacent to, and outside the HFF area. The phased investigation commenced with a DPT (Phase I) TPH soil survey along the various fuel pipelines throughout CNC to identify areas of aggregate petroleum contamination. These biased DPT screening samples were collected from areas most likely to have been impacted (i.e., surface where the pipelines and valves were at the surface and subsurface adjacent to buried pipelines). Areas with TPH results greater than 50 mg/kg diesel range organics (DRO) or 50 μ g/kg gasoline range organics (GRO) were targeted for Phase II, constituent specific soil and groundwater sampling and designated as Areas 1-18. During Phase II, discrete samples were collected from these areas and analyzed for standard analytical parameters (VOCs, SVOCs, pesticides and PCBs, metals, and cyanide).

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Areas 19 and 20, adjacent to the HFF, were later added to this group of sites. DPT soil and groundwater sampling, and well installation and sampling, was performed at Areas 19 and 20 in 1999.

*what if anything
has been
offered?* The FDS CAR (EnSafe, September 10, 1998) found that Areas 8, 12, 13, 14, and 15 exhibited limited soil and groundwater contamination associated with the FDS. Intrinsic remediation was recommended for soil at Areas 8, 12, 13, and 14, along with monitoring of groundwater. No further action was recommended for soil or groundwater at Area 11 and 15. Areas 19 and 20 have not yet been submitted to SCDHEC, because the additional results are pending.

Figures 2-1 and 2-2 on pages 23 and 24 present the analytical suites by soil and groundwater, respectively, for all EnSafe samples collected in and adjacent to the HFF area. Table 2.1 on page 32 presents the Phase I TPH analytical results of the screening samples collected during the FDS investigation in and adjacent to the HFF.

Figures 2-3 and 2-4 on pages 25 and 26 present the Phase I TPH data for surface and subsurface soil, respectively. Phase II soil samples were collected from areas of elevated TPH. Phase II soil samples were analyzed for constituent specific analyses. Table 2.2 on page 34 presents the Phase II samples that were collected within and adjacent to the HFF area during the FDS investigation. Of the 18 areas found to require further evaluation under Phase II, Areas 8, 11, 12, 13, 14, and 15 are adjacent to the HFF area. The Phase II soil analytical results for these areas are presented in Table 2.3 on page 35. Areas of potential groundwater contamination were identified for investigation, based on the FDS Phase I/II soil investigation. Monitoring wells were installed so that groundwater samples could be collected from the saturated backfill material surrounding the pipeline or at a comparable depth. Table 2.4 on page 44 details the monitoring wells that were sampled in conjunction with the FDS areas adjacent to the HFF. The analytical data summary for these samples are presented in Table 2.5 on page 46.

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2.8.1 Area 8

Area 8, associated with FDS Phase I sample FDSSC04701, had TPH-GRO results of 19,000 $\mu\text{g/kg}$, prompting subsequent Phase II soil and groundwater sampling (Table 2.1).

Phase II sample FDSSC47A exhibited total naphthalenes above the respective RBSL.

All VOCs and metals at this boring were below appropriate soil screening standards (Table 2.3).

No VOCs were detected in samples from the Area 8 monitoring wells. The groundwater RBSL for total PAHs was exceeded during the first, but not the second, sampling event at Area 8. No RBSLs for groundwater metals were exceeded at Area 8. No groundwater RBSL constituents were exceeded in downgradient well FDS08D, which was installed later at the site (Table 2.5).

Subsequent to the installation and sampling of FDS08D, it was recommended that two quarterly monitoring events of the Area 8 wells be conducted. If concentrations remain below groundwater RBSLs during this monitoring program, it was recommended that these results be used to support a no further action decision for soil and groundwater at Area 8 (EnSafe, June 30, 1999).

2.8.2 Area 11

The Phase I TPH-GRO sample results for soil boring FDSSC05101 was 42.75 $\mu\text{g/kg}$, prompting subsequent Phase II soil and groundwater sampling within Area 11 (Table 2.1). The primary sample result was 77.6 $\mu\text{g/kg}$ TPH-GRO. This value is an average of the primary and duplicate sample collected at this location. No VOCs were detected in subsurface soil at Area 11. All RBSL SVOCs and metals detected at Area 11 were below their respective soil screening standards (Table 2.3).

No RBSL VOCs or metals were exceeded in groundwater samples from the Area 11 monitoring wells. No RBSL SVOCs were detected in groundwater at Area 11 (Table 2.5).

Again mention where this is in relation to HFF

surface or subsurface?

may want to mention VOCs & metals were detected

where is this on Figure 3-2

has this been done yet?

which way is groundwater flowing? would areas be a source of cont. for HFF or receptor from source of HFF?

where were Phase II samples collected?

VOCs & metals detected but not identified as COCs

How many samples sampled?
GW flow?

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Because no groundwater RBSLs were exceeded in either of two sampling events at Area 11, the FDS CAR (EnSafe, September 10, 1998) recommended and SCDHEC concurred no further action for this area. *state use division*

2.8.3 Areas 12, 13, and 14

The Phase I TPH-GRO sample results for soil borings FDSSC06501, FDSSC6601, and FDSSC6701 were 147 $\mu\text{g/kg}$, 67 $\mu\text{g/kg}$, and 106 $\mu\text{g/kg}$, respectively, prompting subsequent Phase II soil and groundwater sampling within Areas 12, 13, and 14 (Table 2.1). *RBCA* **RBSL** VOCs and metals were below their respective screening levels at Areas 12, 13, and 14. The RBSL for total naphthalenes was exceeded at FDCSC06601 and FDSSC06701 (Table 2.3).

No RBSL VOCs were detected in groundwater samples from Areas 12, 13, and 14. RBSL SVOCs were below their respective screening levels at Area 12, 13, and 14. The RBSL arsenic (50 $\mu\text{g/L}$) was exceeded during the second sampling event at location FDS13A (210 $\mu\text{g/L}$). During the third sampling event at FDS13A, arsenic (18.3 $\mu\text{g/L}$) was below the RBSL.

To support the FDS CAR (EnSafe, September 10, 1998) recommendation of intrinsic remediation for the total naphthalenes detected in soil, the follow-on Letter Report for these areas (EnSafe, June 30, 1999) recommended limited monitoring of groundwater for these areas. This report recommended that groundwater at well FDS14B downgradient of FDSSC06701 and wells FDS13B and FDS13C downgradient of FDSSC06601 be sampled and analyzed for RBSL SVOCs two more times at three-month intervals to demonstrate that soil contaminants are not adversely impacting groundwater. *Has this been done? what implications might this have on HFF?*

2.8.4 Area 15

The Phase I TPH-GRO sample results for surface-soil boring FDSSH02301 was 501 $\mu\text{g/kg}$, prompting subsequent Phase II soil and groundwater sampling within Area 15 (Table 2.1). RBSL VOCs and metals were below their respective screening levels in soil at Area 15.

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Total naphthalenes were elevated at FDSSH02301. Based on these results, a 3- to 5-foot subsurface soil sample, FDSSH02302, was collected and analyzed to determine the vertical extent of naphthalenes at Area 15. No subsurface soil concentration from this sample exceeded its appropriate RBSL (Table 2.3).

No RBSL VOCs/metals were exceeded in groundwater samples from Area 15. No RBSL SVOCs were detected in Area 15 groundwater samples (Table 2.5).

Because of the absence of RBSL parameters detected in surface or subsurface soil and groundwater at Area 15, EnSafe recommended and SCDHEC concurred no further action for soil or groundwater at this area.

Area 19
Area 20
2.8.5 Other Areas

Though not assigned an area, Phase I boring FDSSC084 was given constituent specific analyses during Phase II due to observed conditions. No soil RBSL parameters were exceeded at this location (Table 2.3).

cross reference the
NET work

Areas 19 and 20 were added to the scope of the FDS investigation in 1998. During 1999 and 2000, field investigations were conducted at Areas 19 and 20 to identify potential impacts to soil and groundwater, and to define the extent of free product contamination, if any, at these sites. DPT soil and groundwater samples were collected at these sites and analyzed for RBSL VOC and SVOC parameters. Initial rounds of DPT sampling focused on areas of contamination identified by the previous site investigations or IM activities. Subsequent DPT sampling was performed to delineate the extent of contamination around RBSL exceedances. Table 2.6 on page 57 details the Areas 19 and 20 DPT soil and groundwater samples, and their analyses. Table 2.7 on page 61 summarizes the Areas 19 and 20 DPT analytical soil results. Table 2.8 on page 68 presents a summary of the DPT groundwater results

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for Areas 19 and 20. Seven permanent shallow groundwater monitoring wells were installed at Areas 19, along with six wells at Area 20, to confirm the DPT results and facilitate future monitoring, if required, at these sites. Table 2.9 on page 74 presents a summary of the monitoring well analytical results at Areas 19 and 20.

2.8.5.1 Area 19

Area 19 DPT soil data revealed benzene, ethylbenzene, and naphthalenes detected above the appropriate groundwater protection RBSLs, with most exceedances detected near the source area (the former Facility 148) along the southwest side of Building 98.

DPT groundwater results for Area 19 revealed benzene, total PAHs, naphthalene, 2-methylnaphthalene, and chrysene concentrations above the appropriate groundwater RBSLs. These results revealed that groundwater adjacent to Building 98 has been impacted by petroleum constituents, primarily within the same area of impacted soil adjacent to the southwest side of Building 98.

Groundwater analytical data from the Area 19 monitoring wells exhibited no RBSL exceedances. The monitoring well results showed that the area of localized groundwater contamination defined during the DPT sampling was appropriately delineated at this site.

Why this recommendation if no exceedances?

The FDS Car Addendum will recommend that Area 19 monitoring wells be sampled quarterly for a period of one year. The recommended analyses for these quarterly samples will be RBSL VOCs and SVOCs to ensure that constituents detected in soil and groundwater at Area 19 are not migrating off-site.

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2.8.5.2 Area 20

Area 20 DPT soil analytical data revealed that benzene, naphthalene, and total naphthalenes were present above the appropriate groundwater protection RBSLs (Table 2.7). Most exceedances were detected adjacent to the footprint of the Viaduct Road pipeline IM and also northwest of the removal area along the fuel pipeline corridor which parallels Hobson Avenue.

DPT groundwater analytical results for Area 20 detected total PAHs, naphthalene, 2-methylnaphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene above the appropriate RBSLs (Table 2.8). These results revealed that naphthalene and total PAHs exceeded their RBSLs at sample locations northwest of the pipeline removal area along Hobson Avenue. Petroleum contaminated soil in this area is the likely source of the groundwater contamination at this locale.

Groundwater analytical data from the Area 20 monitoring wells exhibited no RBSL exceedances (Table 2.9). The monitoring well results showed that the area of localized groundwater contamination defined during the DPT sampling was appropriately delineated at this site.

why recommendation if ?

The FDS Car Addendum will recommend that Area 20 monitoring wells be sampled quarterly for a period of one year. The recommended analyses for these quarterly samples will be RBSL VOCs and SVOCs to ensure that constituents detected in soil and groundwater at Area 20 are not migrating off-site.

3.0 HOBSON FUEL FARM INVESTIGATION

As mentioned in Section 1.0, the primary purpose of the HFF investigation was to perform a focused review of previous investigations to determine whether the HFF area had been adequately characterized to support site closeout requirements. Particular interest was placed on the possibility that RCRA constituents might have been overlooked, since the majority of the site was investigated using SCDHEC's petroleum program guidelines. The secondary purpose was to

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provide adequate information to assist the Project Team in making a site disposition recommendation to the RDA.

DPT soil (surface [0-1 ft bgs] and subsurface soil [3-5 ft bgs] intervals) and shallow groundwater samples were collected to characterize the nature and extent of soil and groundwater contamination at the site. The soil and groundwater samples were analyzed for VOC and SVOC parameters. Table 3.1 on page 77 presents the soil and groundwater DPT samples collected and the analyses performed at the HFF. Figure 3-1 on page 27 illustrates the HFF sample locations.

3.1 Data Gaps *→ This discussion needs to be tied into conclusions drawn from previous investigations*
The HFF soil and groundwater DPT sampling points were located to fill the following data gaps:

- No constituent specific soil samples were collected within the HFF area during the FDS Phase II investigation. This was because FDS Phase I TPH sampling results from within the HFF area were below the 50 µg/kg threshold, and thus did not trigger Phase II sampling.
- The need to adequately confirm the contaminated area delineated around tanks 3916 and 3917 by the ESE and KEMRON investigations.
- The need to completely delineate petroleum contamination in soil and groundwater within the HFF and identify potential RCRA concerns prior to property transfer.

3.2 HFF Soil Sample Results

Is this really the case?
Ten DPT soil borings, plus four follow-on borings (data results pending as of this report), were advanced at the HFF. No free product was observed. Surface and subsurface soil results from these borings were compared to the appropriate RBSLs. Table 3.2 on page 79 presents a summary of the analytical results of the DPT soil sampling. Figures 3-2 and 3-3 on pages 28 and 29 provide data summaries of surface soil and subsurface soil results, respectively, for all recently collected soil samples from investigations conducted within the HFF and adjacent areas.

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Two VOCs, acetone and methylene chloride, were detected in surface soil. Neither of these analytes is regulated by a RBSL concentration. In addition, none of these exceeds any other applicable screening value.

Four VOCs, acetone, chlorobenzene, ethylbenzene, and methylene chloride were detected in subsurface soil at the HFF. Of these, only ethylbenzene is a RBSL constituent, and the subsurface soil detection at location HFFSP002 (2 $\mu\text{g}/\text{kg}$) was below the groundwater protection RBSL of 1,260 $\mu\text{g}/\text{kg}$.

Twenty-one SVOCs were detected in soil during the HFF investigation. Of these, total naphthalenes, naphthalene, 2-methylnaphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and dibenz(a,h)anthracene are regulated fuel constituents. Seven of these parameters exceeded the dermal protection RBSLs applicable to surface soil. These surface soil exceedances were limited to locations HFFSP004, HFFSP006 and HFFSP007. The subsurface concentrations of these compounds at these locations were all either non-detect or below the applicable RBSL. Fourteen other SVOCs were detected in surface soil. Of these, only benzo(a)pyrene and indeno(1,2,3-cd)pyrene exceeded the applicable RBCs of 87 $\mu\text{g}/\text{kg}$ and 870 $\mu\text{g}/\text{kg}$ respectively.

Significant subsurface soil impact was limited to location HFFSP008. Concentrations of RBSL parameters total naphthalenes and naphthalene exceeded the RBSL of 210 $\mu\text{g}/\text{kg}$. No other subsurface constituents exceeded applicable screening values.

3.2.1 HFF Soil Analytical Summary

As previously discussed in this report, Figure 2-1 on page 23 illustrates the locations and analytical parameter suites for soil samples collected as part of the investigation of the FDS, Zone L RFI and the HFF. The area was initially screened for surface and subsurface TPH as part of the FDS investigation. The surface and subsurface TPH results are summarized in Figures 2-3 and 2-4 on pages 25 and 26 respectively.

*This would flow better
if discussed sample by sample*

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TPH was detected, less than 100 $\mu\text{g/kg}$ at several surface soil sample locations. The highest detection, FDSSH023 (501 $\mu\text{g/kg}$), was further investigated as Area 15 within the HFF. *what relevance does this have*

Two others are located within the area of contaminated soil identified by KEMRON near former tanks 3900G and 3900H, FDSSH001 (10 $\mu\text{g/kg}$) and FDSSH006 (9.0 $\mu\text{g/kg}$).

The other four locations FDSSH016 (32 $\mu\text{g/kg}$), FDSSH018 (10 $\mu\text{g/kg}$), FDSSH021 (10 $\mu\text{g/kg}$), and FDSSH022 (10 $\mu\text{g/kg}$) are located near tanks 3900E and 3900F.

TPH was detected in subsurface locations FDSSC081 (9 $\mu\text{g/kg}$), FDSSC082 (8 $\mu\text{g/kg}$) and FDSSC083 (8 $\mu\text{g/kg}$), which are associated with underground fuel pipelines, below the screening value of 50 $\mu\text{g/kg}$. TPH detected in subsurface locations FDSSC047 (19,000 $\mu\text{g/kg}$), FDSSC065 (147 $\mu\text{g/kg}$), FDSSC066 (67 $\mu\text{g/kg}$) and FDSSC067 (106 $\mu\text{g/kg}$) exceeded the 50 $\mu\text{g/kg}$ value. These detections resulted in further investigation as Areas 8, 12, 13 and 14 respectively.

*where is an evaluation of
the results?*

Figure 3-2 on page 28 presents the results of a comparison of the constituent-specific analytical results to the RBCA RBSLs and to Region III surface soil RBCs (THQ = 0.1). Areas potentially problematic to redevelopment of the HFF area are HFFSP004, HFFSP005, HFFSP006 and HFFSP007. The compounds of concern in these four locations are SVOCs, commonly associated with petroleum contamination. These four locations are associated with tanks 3900E and 3900F. Other potential problem locations are 037SP003, 037SP004 and 037SP041. These exceedances were driven by arsenic exceeding the RBC. All were below the Zone G background concentration for arsenic of 17.2 $\mu\text{g/kg}$. *this should not be a concern.*

Figure 3-3 on page 29 presents the results of a comparison of the constituent-specific analytical result to the RBCA groundwater protection RBSL and to site-specific SSLs (AOC 619/SWMU 4). Potentially problematic areas are associated with: two points in Area 20, F20SP001 and

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The VOCs detected were 1,2-dichloroethene (total), and methylene chloride. The SVOCs detected were benzoic acid and bis(2-ethylhexyl)phthalate. None of these constituents are RBSL parameters. The concentration of 1,2-dichloroethene, 21 $\mu\text{g/L}$, exceeded the MCL of 5 $\mu\text{g/L}$ and the tapwater RBC of 5.5 $\mu\text{g/L}$. No other screening values were exceeded. None of the compounds detected in groundwater are considered to be fuel constituents.

CONCLUSIONS

This expedited evaluation of the HFF was performed to gain a comprehensive understanding of current soil and groundwater conditions to facilitate property transfer and subsequent development activities. As a result, the potentially problematic areas near the anticipated area of construction, tanks 3916 and 3917, were the primary focus of delineation sampling. Data gaps in soil still exist near tanks 3900E and 3900F. However, delineation in those areas was not included in EnSafe's scope of work for the HFF.

In the area targeted for redevelopment, tanks 3916 and 3917, surface soil exhibited no petroleum related or RCRA constituents which might be a concern. Subsurface soil was only a potential concern at location HFFSP008, where petroleum related SVOCs were detected at concentrations that have the potential to leach to shallow groundwater. This area is a single point exceedance that has been fully delineated should the Navy decide to mitigate the problem. However, EnSafe feels there is no leaching concern because of the conservative screening levels used.

Considering that a building over the site would inhibit percolation and subsequent potential for leaching, the Navy may choose to manage the risk in other ways rather than perform a soil removal at the HFF.

*What about
RCRA vs. non-RCRA
detections?*

we need to be explaining why the default assumption for SSLs don't apply to a single point exceedance

*why would they want to mitigate the
a "problem" that we are saying we
don't feel is a problem?*

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Revision: 0
November 2000*

5.0 REFERENCES

- EnSafe, Inc. (September 10, 1998). *Fuel Distribution System Contamination Assessment Report NAVBASE Charleston, South Carolina.*
- EnSafe, Inc. (June 30, 1999). *Letter Report, Fuel Distribution System Area 8, Charleston Naval Complex, Charleston, South Carolina.*
- EnSafe, Inc. (June 30, 1999). *Letter Report, Fuel Distribution System Areas 12, 13, and 14, Charleston Naval Complex, Charleston, South Carolina.*
- EnSafe, Inc. (January 27, 2000). *Letter Report, Fuel Distribution System Area 15, Charleston Naval Complex, Charleston, South Carolina.*
- KEMRON, Inc. (1990). *Contamination Assessment Report/Remedial Action Plan, Defense Fuel Supply Point, Charleston Naval Base, Charleston, South Carolina.*
- KEMRON, Inc. (1992). *Remedial Activities Summary Report, Defense Fuel Supply Point, Charleston Naval Base, Charleston, South Carolina.*
- NFESC. (April, 1996). *Site Characterization and Analysis Penetrometer System Characterization at AOC 626, Charleston Naval Supply Center Fuel Farm.*
- S&ME, Inc. (May 28, 1992). *Report of the Soil Sampling and Analysis, Environmental Specification Preparation, 800 Foot 18-inch Fuel Pipeline, Charleston Naval Supply Center, Charleston, South Carolina.*
- SPORTENDETHASN. (1997). *Charleston Naval Complex, Building 148 Closure Report.*

*Where is the
reference to
AOC 626 for report?*

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Charleston Naval Complex
Revision: 0
November 2000*

Areas 1 through 20 were addressed in the FDS CAR (EnSafe September 10, 1998). During September-November of 2000, field investigations were conducted at the HFF to identify impacts to soil and groundwater, and to define the extent of free product contamination, if any, within the site area. The limited scope of the HFF investigation was to comprehensively review all previous investigations, address outstanding issues, and fill data gaps to facilitate transfer of the property.

The FDS CAR (EnSafe, September 10, 1998) discusses the objectives, scope, methodology, history and physical setting for the FDS, which are applicable to this HFF site assessment. This report summarizes and compares previous investigation results, describes the specific field investigation conducted, presents and discusses the analytical data collected, and makes appropriate recommendations for the HFF.

1.1 Site History

A historical review of figures and maps was conducted to gain a detailed perspective of the HFF area over time. Prior to the mid-1930s, the portion of the CNC where the HFF is located consisted of marshland along the Cooper River. This marshland was filled over time, and the base was expanded to the southeast over the filled area. The HFF was built over a portion of this filled area between 1936 and 1944. The HFF area originally included four 55,000 barrel (bbl) concrete tanks with brick facing. In 1974, two of these tanks (the former 3900G and 3900H) were switched from storing Navy Special Fuel Oil to the less viscous Navy Distillate. The tanks began to leak, and were taken out of service in 1975. These tanks were demolished in late 1991, and the current steel tanks (3916 and 3917) were constructed in early 1992. The site area was used as a fuel farm until the CNC was closed in the early 1990s.

1.2 Site Geology and Hydrogeology

The FDS CAR (EnSafe, September 10, 1998) discuss the geology and hydrogeology of the FDS, including the HFF area. The shallow groundwater flow is discussed later, relative to the analytical results.



South Carolina Department of Health
and Environmental Control

MEETING REGISTER

Date: 11/20/00

Site Name: CHARLESTON NAVAL COMPLEX

Site ID #: _____

	<u>Attendant</u>	<u>Affiliation</u>	<u>Phone #</u>	<u>E-Mail Address</u>
1.	<u>Tam Knight</u>	<u>SCDHEC - BLW</u>	<u>(803) 898-4257</u>	<u>knightt@columb34</u> <u>.dhec.state.sc.us</u>
2.	<u>Keith Collinsworth</u>	<u>SCDHEC - EDC</u>	<u>(803) 898-3973</u>	<u>Collinsk@columb30</u> <u>dhec.state.sc.us</u>
3.	<u>MIHIR MEHTA</u>	<u>SCDHEC - BLWM</u>	<u>(803) 896-4088</u>	<u>meham@columb34</u> <u>dhec.state.sc.us</u>
4.	<u>TONY HUNT</u>	<u>NAVY</u>	<u>843-820-5525</u>	<u>hntma@efl.south.na.navy.mil</u>
5.	<u>TRIP SNELSON</u>	<u>CH2M-JONES</u>	<u>(904) 363-0911</u>	<u>tsnelson@j2.us.com</u>
6.	<u>PAUL M. BERGSTROM</u>	<u>SCDHEC / ALWM</u>	<u>803-896-4016</u>	<u>bergstrom@columb34.dl</u> <u>state.sc.us</u>
7.	<u>Todd Haverkost</u>	<u>En Safe</u>	<u>843-884-0029</u>	<u>thaverkost@ensafe.com</u>
8.	_____	_____	_____	_____
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14.	_____	_____	_____	_____
15.	_____	_____	_____	_____
16.	_____	_____	_____	_____
17.	_____	_____	_____	_____



ENSAFE INC.

ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

201 North Palafox Street, Suite 200 • Pensacola, FL 32501 • Telephone 850-434-2230 • Facsimile 850-434-2288 • www.ensafe.com

November 28, 2000

Commander, Southern Division
Naval Facilities Engineering Command
Attn: Mr. Gabriel L. Magwood, Code 1849
2155 Eagle Drive, P.O. Box 190010
North Charleston, SC 29419-9010

RE: Site Assessment Report for Hobson Fuel Farm, Charleston Naval Complex,
Charleston, South Carolina (CTO 0144)

Dear Mr. Magwood:

EnSafe Inc. is pleased to submit two copies of the Draft-Final Site Assessment Report for the Hobson Fuel Farm (HFF) at Charleston Naval Complex for your review and comment.

Please provide comments at your earliest convenience so that a final report can be generated and forwarded to the South Carolina Department of Health and Environmental Control.

Should you have any questions or concerns regarding this report please do not hesitate to contact me directly at (850) 434-2230 or via e-mail at csmith@ensafe.com.

Thank you for the opportunity to assist with the assessment of this area.

Sincerely,

ENSAFE INC.

A handwritten signature in black ink, appearing to read "Craig R. Smith".

Craig R. Smith
Project Manager

cc: Todd Haverkost

September 25, 2000

Mr. Paul Bristol
Bureau of Solid and Hazardous Waste
South Carolina Department of Health and Environmental Control
8901 Farrow Road
Columbia, South Carolina 29203

Dear Mr. Bristol:

As requested, EnSafe has compiled all analytical results from samples collected during the RFI and investigation of the Fuel Distribution System within the area of the Hobson fuel farm. This area is roughly bounded by Viaduct Rd., Hobson Ave., Wood St., and the western boundary of CNC.

Phase I TPH data was used to screen for potential areas which may require additional assessment. These biased screening samples were collected from areas most likely to have been impacted, (ie., surface where the pipelines and valves were at the surface and subsurface where pipelined are buried). Subsurface samples were collected directly adjacent to the buried pipeline. Where TPH GRO exceeded 50 ug/kg, discrete samples were collected and analyzed for standard analytical parameters. Six locations within the area of interest had exceedances which triggered Phase II sampling (Areas 8, 11, the combined Areas 12, 13 and 14 and Area 15). The analytical data for these Areas is presented in the attached tables.

Included in the soil analytical results tables are: Soil boring and DPT sampling results from the portion of the Zone L investigation of located in this area; Areas 19 and 20 DPT samples; SWMU 3 soil borings; and, SWMU 24 soil borings.

Included in the groundwater analytical results tables are: DPT and monitoring well sampling results for the portion of the Zone L investigation in this area; Areas 19 and 20 DPT and monitoring well samples; SWMU 3 monitoring well samples; and, SWMU 24 monitoring well samples.

Should you have any questions or require additional information, please contact me at (850) 434-2230 or via e-mail at csmith@ensafe.com.

Thank you for the opportunity to assist with this evaluation,

Sincerely,

ENSAFE

Craig R Smith

Attachments

FDS Soil Samples - Phase I

Boring Location	Sample ID	Date	Depth	Remarks
FDSSC001	FDSSC00101	9/12/96	4-5.5	Fuel staining on soil, fuel odor
FDSSC002	FDSSC00201	9/12/96	4-5.5	Fuel sheen and odor
FDSSC003	FDSSC00301	9/12/96	4-5.5	Slight fuel odor noted
FDSSC004	FDSSC00401	9/12/96	4-5.5	No fuel odor noted
FDSSC005	FDSSC00501	9/12/96	4-5.5	Slight fuel odor noted
FDSSC006	FDSSC00601	9/12/96	4-5.5	No fuel odor noted
FDSSC007	FDSSC00701	9/12/96	4-5	No fuel odor noted
FDSSC008	FDSSC00801	9/13/96	2.8-5.6	Slight fuel odor noted
FDSSC009	FDSSC00901	9/13/96	4-5.5	No fuel odor noted
FDSSC010	FDSSC01001	9/16/96	5.7-72	No unusual observations logged
FDSSC011	FDSSC01101 FDSCC01101*	9/16/96 9/16/96	4-6 4-6	Slight fuel odor noted
FDSSC012	FDSSC01201	9/17/96	6.8	Free product on sample
FDSSC013	FDSSC01301	9/16/96	4.3-5.8	Fuel odor present
FDSSC014	FDSSC01401	9/16/96	6-7.5	Slight fuel odor noted
FDSSC015	FDSSC01501	9/17/96	4-6.6	No fuel odor noted
FDSSC016	FDSSC01601	9/16/96	6-7.5	Fuel odor present
FDSSC017	FDSSC01701	9/17/96	2.9-7.3	Fuel odor present
FDSSC018	FDSSC01801	9/18/96	5-7	No fuel odor noted
FDSSC019	FDSSC01901 FDSCC01901*	9/17/96 9/17/96	4.5-6.5 4.5-6.5	No unusual observations logged
FDSSC020	FDSSC02001	9/17/96	6-8	No unusual observations logged
FDSSC021	FDSSC02101	9/17/96	4-6	Slight fuel odor noted
FDSSC022	FDSSC02201	9/18/96	5-7	No fuel odor noted
FDSSC023	FDSSC02301	9/18/96	4.5-6.5	No fuel odor noted
FDSSC024	FDSSC02401	9/17/96	6-8	No unusual observations logged
FDSSC025	FDSSC02501	9/18/96	3.7-5.3	Slight fuel odor noted
FDSSC026	FDSSC02601	9/18/96	5.8-8.8	No fuel odor noted
FDSSC027	FDSSC02701	9/18/96	5-7	Slight fuel odor noted
FDSSC028	FDSSC02801 FDSCC02801	9/18/96 9/18/96	4.3-6.3 4.3-6.3	Strong fuel odor in entire interval
FDSSC029	FDSSC02901	9/18/96	4.5-6.5	No fuel odor noted
FDSSC030	FDSSC03001	9/19/96	4.5-6.5	Fuel odor present
FDSSC031	FDSSC03101	9/19/96	4.2-6.2	No fuel odor noted

FDS Soil Samples - Phase I

Boring Location	Sample ID	Date	Depth	Remarks
FDSSC032	FDSSC03201	9/19/96	4.5-6.5	Slight fuel odor noted
FDSSC033	FDSSC03301	9/19/96	5-7	Slight fuel odor noted
FDSSC034	FDSSC03401	9/19/96	4.5-7.5	No unusual observations logged
FDSSC035	FDSSC03501	9/19/96	7-9	No fuel odor noted
FDSSC036	FDSSC03601	9/19/96	9-11	No fuel odor noted
	FDSSC03602	9/19/96	13-15	
FDSSC037	FDSSC03701	9/20/96	7-8.5	Smelled like petroleum
	FDSSC03702	9/20/96	12-14	
FDSSC038	FDSSC03801	9/20/96	7-9	No unusual observations logged
	FDSSC03802	9/20/96	12-14	
FDSSC039	FDSSC03901	9/20/96	8-10	No unusual observations logged
	FDSSC03902	9/20/96	10.5-12.5	
FDSSC040	FDSSC04001	9/20/96	5-7	No unusual observations logged
	FDSSC04002	9/20/96	12-14	
	FDSCC04002*			
FDSSC041	FDSSC04101	9/20/96	5-7	Sulfur odor noted
	FDSSC04102	9/20/96	12-14	
FDSSC042	FDSSC04201	9/22/96	5.7-8	No fuel odor noted
	FDSSC04202	9/22/96	11.7-14.1	
FDSSC043	FDSSC04301	9/22/96	5.8-7.6	No fuel odor noted
FDSSC044	FDSSC04401	9/22/96	5.7-7.7	No unusual observations logged
FDSSC045	FDSSC04501	9/22/96	13-15	No unusual observations logged
FDSSC046	FDSSC04601	9/22/96	14-16	No fuel order noted
FDSSC047	FDSSC04701	9/22/96	14-16	Petroleum odor with sheen
FDSSC048	FDSSC04801	9/22/96	14-16	No unusual observations logged
FDSSC049	FDSSC04901	9/22/96	14-16	No unusual observations logged
FDSSC050	FDSSC05001	9/23/96	7.7-9.7	No unusual observations logged
FDSSC051	FDSSC05101	9/23/96	5.7-7.4	Petroleum odor noted
FDSCC051	FDSCC05101*	9/23/96	5.7-7.4	
FDSSC052	FDSSC05201	9/23/96	6-8	No unusual observations logged
FDSSC053	FDSSC05301	9/23/96	unlogged	No fuel odor noted
FDSSC054	FDSSC05401	9/23/96	11-13	No unusual observations logged
FDSSC055	FDSSC05501	9/23/96	5-9	No unusual observations logged
FDSSC056	FDSSC05601	9/23/96	unlogged	No unusual observations logged
FDSSC057	FDSSC05701	9/24/96	3.7-5.5	No fuel odor noted
FDSSC058	FDSSC05801	9/24/96	4-10	Slight fuel odor noted
FDSSC059	FDSSC05901	9/24/96	unlogged	No fuel odor noted

FDS Soil Samples - Phase I

Boring Location	Sample ID	Date	Depth	Remarks
FDSSC060	FDSSC06001	9/24/96	4-6	No unusual observations logged
FDSSC061	FDSSC06101 FDSCC06101*	9/24/96 9/24/96	5-6	No unusual observations logged
FDSSC062	FDSSC06201		No Phase I sample taken at this location	
FDSSC063	FDSSC06301	9/25/96	6.5-8.5	No fuel contamination noted
FDSSC064	FDSSC06401	9/25/96	6.5-8.5	No unusual observations logged
FDSSC065	FDSSC06501	9/25/96	6.3-10.6	Strong fuel odor noted
FDSSC066	FDSSC06601	9/25/96	8.5-10.5	Strong fuel odor noted
FDSSC067	FDSSC06701	9/25/96	8.2-11	No unusual observations logged
FDSSC068	FDSSC06801	9/30/96	8-10	No unusual observations logged
FDSSC069	FDSSC06901	9/30/96	6.5-8.5	No unusual observations logged
FDSSC070	FDSSC07001	9/30/96	7.3-9.2	No unusual observations logged
FDSSC071	FDSSC07101	9/30/96	7.2-9.2	No unusual observations logged
FDSSC072	FDSSC07201	10/01/96	unlogged	No unusual observations logged
FDSSC073	FDSSC07301	10/01/96	unlogged	No unusual observations logged
FDSSC074	FDSSC07401	10/01/96	9-11	No unusual observations logged
FDSSC075	FDSSC07501	10/01/96	8-10	No unusual observations logged
FDSSC076	FDSSC07601	10/01/96	6.6-8.4	No fuel odor noted
FDSSC077	FDSSC07701 FDSCC07701*	10/01/96 10/01/96	7-9 7-9	H ₂ S odor noted
FDSSC078	FDSSC07801	10/01/96	7-9	Unrecognizable organic odor noted
FDSSC079	FDSSC07901	10/01/96	5-7	No fuel odor noted
FDSSC080	FDSSC08001 FDSCC08001*	10/01/96 10/01/96	6-8 6-8	Fuel odor present
FDSSC081	FDSSC08101	10/02/96	7.5-9.5	No unusual observations logged
FDSSC082	FDSSC08201	10/02/96	5.7-7.3	No fuel odor noted
FDSSC083	FDSSC08301	10/02/96	6-8	No unusual observations logged
FDSSC084	FDSSC08401	10/02/96	7-11	Slight fuel odor noted
FDSSC085	FDSSC08501	10/02/96	5-7	No fuel odor noted
FDSSC086	FDSSC08601 FDSCC08601*	10/02/96	5-7 5-7	No fuel odor noted
FDSSC087	FDSSC08701	10/02/96	4-6	No fuel odor noted
FDSSC088	FDSSC08801	10/02/96	9-11	No fuel odor noted
FDSSC089	FDSSC08901	10/02/96	7-9	No fuel odor noted

FDS Soil Samples - Phase I

Boring Location	Sample ID	Date	Depth	Remarks
FDSSC090	FDSSC09001	10/03/96	3-5	No unusual observations logged
FDSSC091	FDSSC09101 FDSCC09101*	10/03/96 10/03/96	9-11 9-11	No unusual observations logged
FDSSC092	FDSSC09201	10/03/96	6-8	No fuel odor noted
FDSSC093	FDSSC09301	10/03/96	6-8	No unusual observations logged
FDSSC094	FDSSC09401	10/03/96	5-7	Strong fuel odor noted
FDSSC095	FDSSC09501 FDSCC09501*	10/03/96 10/03/96	5-7 5-7	Fuel odor throughout interval
FDSSC096	FDSSC09601	10/03/96	5-7	No unusual observations logged
FDSSC097	FDSSC09701 FDSSC09702	10/03/96 10/03/96	7-9 9-11	Fuel odor noted
FDSSC098	FDSSC09801	10/03/96	9-11	No fuel odor noted
FDSSC099	FDSSC09901	10/03/96	9-11	No fuel odor noted
FDSSC100	FDSSC10001 FDSCC10001*	10/04/96 10/04/96	13-15 13-15	No fuel odor noted
FDSSC101	FDSSC10101	10/04/96	9-11	No fuel odor noted
FDSSC102	FDSSC10201	10/04/96	9-11	No fuel odor noted
FDSSC103	FDSSC10301	10/04/96	9-11	No fuel odor noted
FDSSC104	FDSSC10401 FDSSC10402	10/04/96 10/04/96	4-6 9-11	No fuel odor noted
FDSSC105	FDSSC10501	10/04/96	4-5	No fuel odor noted
FDSSC106	FDSSC10601	10/04/96	7-9	Slight fuel odor noted
FDSSC107	FDSSC10701 FDSCC10701*	10/04/96 10/04/96	6-8 6-8	No fuel odor noted
FDSSC108	FDSSC10801	10/04/96	6-8	No fuel odor noted
FDSSC109	FDSSC10901	10/05/96	7-9	No fuel odor noted
FDSSC110	FDSSC11001	10/05/96	7-9	No fuel odor noted
FDSSC111	FDSSC11101	10/05/96	6-8	No fuel odor noted
FDSSC112	FDSSC11201	10/05/96	5-7	No fuel odor noted
FDSSC113	FDSSC11301	10/05/96	5-7	No fuel odor noted
FDSSC114	FDSSC11401 FDSCC11401*	10/05/96 10/05/96	3-5 3-5	No fuel odor noted
FDSSC115	FDSSC11501	10/05/96	3-5	No fuel odor noted
FDSSH001	FDSSH00101	10/18/96	0-1	
FDSSH002	FDSSH00201	10/17/96	0-1	
FDSSH003	FDSSH00301	10/17/96	0-1	

FDS Soil Samples - Phase I

Boring Location	Sample ID	Date	Depth	Remarks
FDSSH004	FDSSH00401	10/17/96	0-1	
FDSSH005	FDSSH00501	10/17/96	0-1	
FDSSH006	FDSSH00601	10/21/96	0-1	
FDSSH007	FDSSH00701	10/17/96	0-1	
FDSSH008	FDSSH00801	10/21/96	0-1	
FDSSH009	FDSSH00901	10/21/96	0-1	
FDSSH010	FDSSH01001	10/21/96	0-1	
FDSSH011	FDSSH01101	10/17/96	0-1	
FDSSH012	FDSSH01201	10/18/96	0-1	
FDSSH013	FDSSH01301	10/17/96	0-1	
FDSSH014	FDSSH01401	10/17/96	0-1	
FDSSH015	FDSSH01501	10/17/96	0-1	
FDSSH016	FDSSH01601	10/18/96	0-1	
FDSSH017	FDSSH01701	10/18/96	0-1	
FDSSH018	FDSSH01801	10/18/96	0-1	
FDSSH019	FDSSH01901	10/18/96	0-1	
FDSSH020	FDSSH02001	10/18/96	0-1	
	FDSCH02001*	10/18/96	0-1	
FDSSH021	FDSSH02101	10/18/96	0-1	
FDSSH022	FDSSH02201	10/18/96	0-1	
FDSSH023	FDSSH02301	10/17/96	0-1	Strong fuel odor noted
FDSSH024	FDSSH02401	10/21/96	0-1	Strong fuel odor noted
	FDSCH02401*	10/21/96	0-1	
FDSSH025	FDSSH02501	10/21/96	0-1	
FDSSH026	FDSSH02601	10/21/96	0-1	Strong fuel odor noted
FDSSH027	FDSSH02701	10/21/96	0-1	

Note

* = Indicates a duplicate sample.

H₂S = hydrogen sulfide

All Phase I samples analyzed for total petroleum hydrocarbons-gasoline range organics (TPH-GRO) and TPH-diesel range organics (DRO) unless noted.

Phase I
Detected Subsurface Soil TPH Concentrations
Fuel Distribution System
NAVBASE

Sample ID	Result	Area
TPH-DRO Diesel (mg/kg)		
FDSSC02701	30.20	
FDSSC03001	102.00	Area 7
FDSSC11401	336.00	Area 18
TPH-GRO Gasoline (µg/kg)		
FDSSC00101	14.00	
FDSSC00201	16300.00	Area 1
FDSSC00301	24.00	
FDSSC00401	13.00	
FDSSC00501	11.00	
FDSSC00601	9.00	
FDSSC00701	35.00	
FDSSC00801	24.80	
FDSSC00901	13.50	
FDSSC01001	22.60	
FDSSC01101	61.80	Area 4
FDSSC01201	124000.00	Area 2
FDSSC01301	77.60	Area 6
FDSSC01401	67.50	Area 3
FDSSC01501	25.50	
FDSSC01601	65.00	Area 5
FDSSC01701	32.70	
FDSSC01901	37.95	
FDSSC02001	23.60	
FDSSC02101	12.40	
FDSSC02201	10.00	
FDSSC02301	14.00	
FDSSC02501	10.00	
FDSSC02601	29.00	
FDSSC02801	25.50	
FDSSC02901	13.00	
FDSSC03001	9.00	

Phase I
Detected Subsurface Soil TPH Concentrations
Fuel Distribution System
NAVBASE

Sample ID	Result	Area
FDSSC03101	8.00	
FDSSC03201	27.00	
FDSSC03301	18.00	
FDSSC03602	15.00	
FDSSC03701	23.80	
FDSSC03702	20.30	
FDSSC03901	17.20	
FDSSC03902	24.00	
FDSSC04001	16.40	
FDSSC04002	15.40	
FDSSC04101	14.60	
FDSSC04102	14.00	
FDSSC04201	8.51	
FDSSC04202	21.50	
FDSSC04301	23.70	
FDSSC04401	35.80	
FDSSC04601	11.10	
FDSSC04701	19000.00	Area 8
FDSSC04801	8.88	
FDSSC04901	7.12	
FDSSC05001	15.30	
FDSSC05101	42.75 ^a	Area 11
FDSSC05201	8.56	
FDSSC05301	24.60	
FDSSC05401	16.80	
FDSSC05501	63.70	Area 10
FDSSC05601	37.60	
FDSSC05701	17.00	
FDSSC05801	10.00 ^b	Area 9
FDSSC05901	10.00	
FDSSC06001	21.00	
FDSSC06101	8.00	

Phase I
Detected Subsurface Soil TPH Concentrations
Fuel Distribution System
NAVBASE

Sample ID	Result	Area
FDSSC06401	8.00	
FDSSC06501	147.00	Area 12
FDSSC06601	67.00	Area 13
FDSSC06701	106.00	Area 14
FDSSC06801	18.00	
FDSSC06901	8.00	
FDSSC07001	15.00	
FDSSC07201	8.00	
FDSSC07301	15.00	
FDSSC07401	8.00	
FDSSC07701	11.50	
FDSSC08101	9.00	
FDSSC08201	8.00	
FDSSC08301	8.00	
FDSSC08401	7.00	
FDSSC08801	9.00	
FDSSC08901	35.00	
FDSSC09501	33078.50	Area 17
FDSSC09701	25.00	
FDSSC09702	87.00	Area 16
FDSSC10001	17.00	
FDSSC10501	42.00	
FDSSC10601	7.00	
FDSSC10701	9.50	
FDSSC11201	9.00	
FDSSC11301	15.00	
FDSSC11501	7.00	
FDSSH00101	10.00	
FDSSH00601	9.00	
FDSSH01201	9.00	
FDSSH01601	32.00	
FDSSH01801	10.00	

Phase I
Detected Subsurface Soil TPH Concentrations
Fuel Distribution System
NAVBASE

Sample ID	Result	Area
FDSSH02101	10.00	
FDSSH02201	10.00	
FDSSH02301	501.00	Area 15
FDSSH02601	20.00	

Notes:

a = Average of original duplicate concentrations. Original sample concentration was 77.6 $\mu\text{g/kg}$.

b = Included based on visual observation of gross contamination.

Bolded concentrations exceed 50 $\mu\text{g/kg}$ (GRO) or 50 mg/kg (DRO).

FDS Soil Samples - Phase II

Boring Location	Sample Identifier	Date	Sample Interval	Remarks
FDSSC002	FDSSC00201	12/4/96	4-6	Fuel odor noted
FDSSC011	FDSSC01101	12/4/96	4-6	No unusual observations logged
FDSSC012	FDSSC01201	12/4/96	6-8	Free product present
FDSSC013	FDSSC01301	12/4/96	4-6	Oily sheen present
FDSSC014	FDSSC01401	12/5/96	6-8	Strong fuel odor noted, 117 ppm FID
FDSSC016	FDSSC01601	12/4/96	6-8	Fuel odor noted
FDSSC030	FDSSC03001	12/4/96	4.5-6.5	No odor noted, 83 ppm FID
FDSSC47A	FDSSC47A01	9/24/96	13.5-15.5	No unusual observations logged
FDSSC051	FDSSC05101	1/13/97	5-7	
FDSSC055	FDSSC05501	12/5/96	6-8	No unusual observations logged, 17 ppm FID
FDSSC058	FDSSC05801	9/24/96	4-6	Fuel odor
FDSSC062	FDSSC06201	12/10/96	0-1	Strong fuel odor noted
FDSSC065	FDSSC06501	9/25/96	6.3-10.6	Strong fuel odor noted
FDSSC066	FDSSC06601	12/4/96	8.5-10.5	Strong fuel odor
FDSSC067	FDSSC06701 FDSCC06701*	12/4/96 12/4/96	8.5-10.5 8.5-10.5	Strong fuel odor noted, 173 ppm FID
FDSSC084	FDSSC08401	10/02/96	7-11	Slight fuel odor noted
FDSSC094	FDSSC09401	10/03/96	5-7	Strong fuel odor noted
FDSSC095	FDSSC09501	12/05/96	5-7	Strong fuel odor noted
FDSSC097	FDSSC09701 FDSCC09701*	12/05/96 12/5/96	8-10 8-10	Strong fuel odor noted
FDSSC114	FDSSC11401	12/05/96	3-5	No unusual observations logged, 54 ppm FID
FDSSH023	FDSSH02301	10/17/96	0-1	Strong fuel odor noted
FDSSH024	FDSSH02401	10/21/96	0-1	Strong fuel odor noted
FDSSH026	FDSSH02601	10/21/96	0-1	Strong fuel odor noted

Notes:

- 1 = Phase II sample collected concurrently with Phase I TPH sample based on field observations.
 - * = Duplicates were analyzed for Appendix IX parameters (metals, pesticides/PCBs, herbicides, organophosphorous (OP) pesticides, dioxins, SVOAs, VOAs); cyanide, and hex-chrome, Level IV.
 - FID = Flame ionization detector
 - ppm = parts per million
- Samples analyzed using SW-846 methods (metals, pesticides/PCBs, SVOAs, VOAs) at data quality objective (DQO) Level III.

**Analytes Detected in Subsurface Soil
Fuel Distribution System**

Parameters	Location	Subsurface Conc.	RBSL/SSL	Subsurface Background
Area 8				
TPH - GRO ($\mu\text{g/kg}$)				
Gasoline	FDSSC04701	19000	NL/NL	NA
Volatile Organic Compounds ($\mu\text{g/kg}$)				
Toluene	FDSSC47A01	4	1622/12000	NA
Semivolatile Organic Compounds ($\mu\text{g/kg}$)				
Total Naphthalenes	FDSSC47A01	5210	210/84000	NA
2-Methylnaphthalene	FDSSC47A01	5100	NL/126000	NA
Naphthalene	FDSSC47A01	110	NL/84000	NA
Acenaphthene	FDSSC47A01	430	NL/570000	NA
Anthracene	FDSSC47A01	280	NL/1200000	NA
Benzo(a)anthracene	FDSSC47A01	300	73084/2000	NA
Dibenzofuran	FDSSC47A01	330	NL/50000	NA
Fluoranthene	FDSSC47A01	190	NL/4300000	NA
Fluorene	FDSSC47A01	570	NL/560000	NA
Phenanthrene	FDSSC47A01	1600	NL/1380000	NA
Pyrene	FDSSC47A01	710	NL/4200000	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSC47A01	15000	NL/1000000	23600
Arsenic (As)	FDSSC47A01	16	NL/29	15.5*
Barium (Ba)	FDSSC47A01	27.3	NL/1600	64.5
Beryllium (Be)	FDSSC47A01	1	NL/63	1.63
Calcium (Ca)	FDSSC47A01	30800	NL/NL	NL
Chromium (Cr)	FDSSC47A01	29.6	NL/1000000	43.4*
Cobalt (Co)	FDSSC47A01	5.6	NL/2000	8.14
Copper (Cu)	FDSSC47A01	18.9	NL/920	32.6
Iron (Fe)	FDSSC47A01	19600	NL/NL	NL
Lead (Pb)	FDSSC47A01	30.3	NL/400	66.3
Magnesium (Mg)	FDSSC47A01	4270	NL/NL	NL
Manganese (Mn)	FDSSC47A01	186	NL/1100	291
Mercury (Hg)	FDSSC47A01	0.09	NL/2.1	0.31
Potassium (K)	FDSSC47A01	1870	NL/NL	NL

**Analytes Detected in Subsurface Soil
Fuel Distribution System**

Parameters	Location	Subsurface Conc.	RBSL/SSL	Subsurface Background
Inorganics (mg/kg)				
Selenium (Se)	FDSSC47A01	1.00	NL/5	1.26
Sodium (Na)	FDSSC47A01	2300	NL/NL	NL
Vanadium (V)	FDSSC47A01	42.7	NL/6000	72.5
Zinc (Zn)	FDSSC47A01	77.9	NL/12000	145
Area 11				
TPH - GRO (µg/kg)				
Gasoline	FDSSC05101	42.75	NL/NL	NA
Semivolatile Organic Compounds (µg/kg)				
bis(2-Ethylhexyl)phthalate	FDSSC05101	1500	NL/3600000	NA
Chrysene	FDSSC05101	80	12998/160000	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSC05101	5690	NL/1000000	23600
Barium (Ba)	FDSSC05101	23.3	NL/1600	64.5
Beryllium (Be)	FDSSC05101	0.24	NL/63	1.63
Cadmium (Cd)	FDSSC05101	0.05	NL/8	0.48
Calcium (Ca)	FDSSC05101	1770	NL/NL	NL
Chromium (Cr)	FDSSC05101	6.1	NL/1000000	43.4 ^a
Cobalt (Co)	FDSSC05101	0.67	NL/2000	8.14
Copper (Cu)	FDSSC05101	2.6	NL/920	32.6
Iron (Fe)	FDSSC05101	4300	NL/NL	NL
Lead (Pb)	FDSSC05101	8.8	NL/400	66.3
Magnesium (Mg)	FDSSC05101	269	NL/NL	NL
Manganese (Mn)	FDSSC05101	27.1	NL/1100	291
Mercury (Hg)	FDSSC05101	0.25	NL/2.1	0.31
Nickel (Ni)	FDSSC05101	2.8	NL/130	18.3
Sodium (Na)	FDSSC05101	175	NL/NL	NL
Thallium (Tl)	FDSSC05101	0.41	NL/0.95	0.95
Vanadium (V)	FDSSC05101	15.5	NL/6000	72.5
Zinc (Zn)	FDSSC05101	9.9	NL/12000	145

**Analytes Detected in Subsurface Soil
Fuel Distribution System**

Parameters	Location	Subsurface Conc.	RBSL/SSL	Subsurface Background
Area 12, 13, 14				
TPH - GRO (µg/kg)				
Gasoline	FDSSC06501	147	NL/NL	NA
	FDSSC06601	67		
	FDSSC06701	106		
Volatile Organic Compounds (µg/kg)				
Carbon disulfide	FDSSC06601	2	NL/32000	NA
	FDSSC06701	1		
Toluene	FDSSC06501	47	1622/12000	NA
	FDSSC06601	4		
	FDSSC06701	12		
Xylene (Total)	FDSSC06601	45	42471/148000	NA
	FDSSC06701	3		
Semivolatile Organic Compounds (µg/kg)				
Total Naphthalenes	FDSSC06501	62	210/84000	NA
	FDSSC06601	6500		
	FDSSC06701	4700		
2-Methylnaphthalene	FDSSC06501	62	NL/126000	NA
	FDSSC06601	3100		
	FDSSC06701	4700		
Naphthalene	FDSSC06601	3400	NL/84000	NA
Acenaphthylene	FDSSC06501	130	NL/570000	NA
	FDSSC06601	3000		
	FDSSC06701	1400		
Anthracene	FDSSC06501	110	NL/12000000	NA
	FDSSC06601	3900		
	FDSSC06701	1450		
Benzo(a)anthracene	FDSSC06501	86	73084/2000	NA
	FDSSC06601	1800		
	FDSSC06701	1355		
Benzo(b)fluoranthene	FDSSC06501	72	29097/5000	NA
	FDSSC06601	630		
	FDSSC06701	615		
Benzo(k)fluoranthene	FDSSC06601	710	231109/49000	NA
	FDSSC06701	670		
Benzo(a)pyrene	FDSSC06601	930	NL/8000	NA
	FDSSC06701	935		
Benzo(g,h,i)perylene	FDSSC06601	550	NL/4.66E+08	NA
	FDSSC06701	655		
Chrysene	FDSSC06501	70	12998/160000	NA
	FDSSC06601	2000		
	FDSSC06701	1510		
Dibenz(a,h)anthracene	FDSSC06601	120	87866/2000	NA
	FDSSC06701	170		
Dibenzofuran	FDSSC06601	2700	NL/50000	NA
	FDSSC06701	1085		
Di-n-octyl phthalate	FDSSC06701	45	NL/10000000	NA
Fluoranthene	FDSSC06501	120	NL/4300000	NA
	FDSSC06601	6000		
	FDSSC06701	2700		
Fluorene	FDSSC06501	140	NL/560000	NA
	FDSSC06601	4400		
	FDSSC06701	2000		
Indeno(1,2,3-cd)pyrene	FDSSC06601	460	NL/14000	NA
	FDSSC06701	460		

**Analytes Detected in Subsurface Soil
Fuel Distribution System**

Parameters	Location	Subsurface Conc.	RBSL/SSL	Subsurface Background
Semivolatile Organic Compounds (µg/kg)				
Phenanthrene	FDSSC06501	240	NL/1380000	NA
	FDSSC06601	15000		
	FDSSC06701	6150		
Pyrene	FDSSC06501	290	NL/4200000	NA
	FDSSC06601	5300		
	FDSSC06701	3700		
Dioxin (ng/kg)				
Dioxin(2,3,4,8-TCDD TEQs ¹)	FDSSC06701	0.0847	NL/1900	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSC06501	28400	NL/1000000	23600
	FDSSC06601	15400		
	FDSSC06701	12050		
Antimony (Sb)	FDSSC06501	.51	NL/5	ND
Arsenic (As)	FDSSC06501	17	NL/29	15.5 ^a
	FDSSC06601	10.2		
	FDSSC06701	10.35		
Barium (Ba)	FDSSC06501	40.6	NL/1600	64.5
	FDSSC06601	33.9		
	FDSSC06701	25.65		
Beryllium (Be)	FDSSC06501	1.3	NL/63	1.63
	FDSSC06601	.76		
	FDSSC06701	.62		
Calcium (Ca)	FDSSC06501	14500	NL/NL	NL
	FDSSC06601	40000		
	FDSSC06701	24100		
Chromium (Cr)	FDSSC06501	42.9	NL/1000000	43.4 ^a
	FDSSC06601	28.7		
	FDSSC06701	24.55		
Cobalt (Co)	FDSSC06501	6.3	NL/2000	8.14
	FDSSC06601	3.4		
	FDSSC06701	3.1		
Copper (Cu)	FDSSC06501	24.8	NL/920	32.6
	FDSSC06601	18.5		
	FDSSC06701	14.25		
Iron (Fe)	FDSSC06501	30700	NL/NL	NL
	FDSSC06601	17800		
	FDSSC06701	23900		
Lead (Pb)	FDSSC06501	42.9	NL/400	66.3
	FDSSC06601	28.2		
	FDSSC06701	27.6		
Magnesium (Mg)	FDSSC06501	4840	NL/NL	NL
	FDSSC06601	6460		
	FDSSC06701	2585		
Manganese (Mn)	FDSSC06501	582	NL/1100	291
	FDSSC06601	163		
	FDSSC06701	238.5		
Mercury (Hg)	FDSSC06501	.22	NL/2.1	0.31
	FDSSC06601	.2		
	FDSSC06701	.175		
Nickel (Ni)	FDSSC06501	13.9	NL/130	18.3
	FDSSC06601	10.1		
	FDSSC06701	8.15		

**Analytes Detected in Subsurface Soil
Fuel Distribution System**

Parameters	Location	Subsurface Conc.	RBSL/SSL	Subsurface Background
Inorganics (mg/kg)				
Potassium (K)	FDSSC06501	2580	NL/NL	NL
	FDSSC06601	2260		
	FDSSC06701	1455		
Selenium (Se)	FDSSC06501	1.1	NL/5	1.26
	FDSSC06701	.87		
Sodium (Na)	FDSSC06601	5770	NL/NL	NL
	FDSSC06701	2340		
Thallium (Tl)	FDSSC06501	.57	NL/0.95	0.95
Vanadium (V)	FDSSC06501	69.1	NL/6000	72.5
	FDSSC06601	30.2		
	FDSSC06701	34.8		
Zinc (Zn)	FDSSC06501	97	NL/12000	145
	FDSSC06601	69		
	FDSSC06701	58.55		
Area 15				
TPH - GRO (µg/kg)				
Gasoline	FDSSH02301	501	NL/NL	NA
Volatile Organic Compounds (µg/kg)				
1,1-Dichloroethane	FDSSH02301	85	NL/23000	NA
1,1,1-Trichloroethane	FDSSH02301	48	NL/2000	NA
Ethylbenzene	FDSSH02301	130	7800000/13000	NA
Tetrachloroethene	FDSSH02301	13	NL/60	NA
Toluene	FDSSH02301	22	160000000/12000	NA
Xylene (Total)	FDSSH02301	1800	160000000/148000	NA
Semivolatile Organic Compounds (µg/kg)				
Total Naphthalenes	FDSSH02301	8500	3100000/84000	NA
2-Methylnaphthalene	FDSSH02301	6800	NL/126000	NA
Naphthalene	FDSSH02301	1700	NL/84000	NA
Chrysene	FDSSH02301	240	88000/160000	NA
Fluorene	FDSSH02301	1900	NL/560000	NA
Phenanthrene	FDSSH02301	1900	NL/1380000	NA
Pyrene	FDSSH02301	590	NL/4200000	NA
Pesticides (µg/kg)				
Endrin	FDSSH02301	20	NL/1000	NA
Heptachlor	FDSSH02301	5.3	NL/23000	NA
gamma-Chlordane	FDSSH02301	3.4	NL/10000	NA

**Analytes Detected in Subsurface Soil
Fuel Distribution System**

Parameters	Location	Subsurface Conc.	RBSL/SSL	Subsurface Background
Inorganics (mg/kg)				
Aluminum (Al)	FDSSH02301	2820	NL/1000000	18700
Arsenic (As)	FDSSH02301	1.8	NL/29	17.2
Barium (Ba)	FDSSH02301	13.1	NL/1600	109
Cadmium (Cd)	FDSSH02301	0.19	NL/8	1.07
Calcium (Ca)	FDSSH02301	13,100	NL/NL	NL
Chromium (Cr)	FDSSH02301	9.3	NL/1000000	42.8
Cobalt (Co)	FDSSH02301	1.3	NL/2000	6.60
Iron (Fe)	FDSSH02301	4,860	NL/NL	NL
Lead (Pb)	FDSSH02301	29.5	NL/400	181
Magnesium (Mg)	FDSSH02301	499	NL/NL	NL
Manganese (Mn)	FDSSH02301	29.6	NL/1100	325
Mercury (Hg)	FDSSH02301	0.07	NL/2.1	1.03
Nickel (Ni)	FDSSH02301	4.2	NL/130	1206
Potassium (K)	FDSSH02301	240	NL/NL	NL
Thallium (Tl)	FDSSH02301	0.47	NL/0.95	0.85
Vanadium (V)	FDSSH02301	10.6	NL/6000	60.9
Zinc (Zn)	FDSSH02301	66.8	NL/12000	519

Notes:

a = Background value for non-clay samples

NL = Not listed

NA = Not applicable

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

RBSLs from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) and soil-to-groundwater SSLs (DAF=20) from the *Soil Screening Guidance: Technical Background Document* (USEPA, 1996b) were used as reference concentrations.

Bolded concentrations exceed RBSL or the SSL (if no RBSL is available).

All background values for Zone G are based on twice the mean of grid sample concentrations.

FDS Groundwater Samples

Well Number	Sample Identifier	Date Sampled	Remarks
Area 8			
FDS08A	FDS08A01	1/24/97	Area 8 associated with FDSSC047 and FDSSC47A; elevated TPH-GRO/SVOCs
	FDS08A02	6/05/97	
FDS08B	FDS08B01	1/25/97	
	FDS08B02	6/09/97	
FDS08C	FDS08C01*	1/24/97	*duplicate sample also collected
	FDS08C02*	6/09/97	
FDS08D	FDS08D01	3/05/99	Sampled for metals, VOAs, SVOAs only
Area 11			
FDS11A	FDS11A01	1/28/97	
	FDS11A02	6/11/97	
FDS11B	FDS11B01	1/28/97	
	FDS11B02	6/11/97	
FDS11C	FDS11C01*	1/28/97	*duplicate sample also collected
	FDS11C02*	6/11/97	
Area 12			
FDS12A	FDS12A01*	1/27/97	Area 12 associated with FDSSC065; elevated TPH-GRO/inorganics *duplicate sample also collected
	FDS12A02*	6/11/97	
FDS12B	FDS11B01	1/27/97	
	FDS11B02	6/11/97	
Area 13			
FDS13A	FDS13A01	1/27/97	Area 13 associated with FDSSC066; elevated TPH-GRO/SVOCs
	FDS13A02	6/11/97	
FDS13B	FDS13B01	1/27/97	
	FDS13B02	6/13/97	
FDS13C	FDS13C01	1/27/97	
	FDS13C02	6/12/97	
FDS13D	FDS13D01	1/27/97	
	FDS13D02	6/12/97	
FDS13E	FDS13E01	1/28/97	
	FDS13E02	6/13/97	
Area 14			
FDS14A	FDS14A01	1/27/97	Area 14 associated with FDSSC067; elevated TPH-GRO/SVOCs/inorganics
	FDS14A02	6/12/97	
FDS14B	FDS14B01	1/27/97	
	FDS14B02	6/12/97	
FDS14C	FDS14C01	1/27/97	
	FDS14C02	6/13/97	

FDS Groundwater Samples

Well Number	Sample Identifier	Date Sampled	Remarks
Area 15			
FDS15A	FDS15A01	1/28/97	Area 15 associated with FDSSH023; elevated TPH-GRO/inorganics
	FDS15A02	6/13/97	
FDS15B	FDS15B01	1/28/97	
	FDS15B02	6/16/97	
FDS15C	FDS15C01	1/28/97	
	FDS15C02	6/16/97	

Notes:

* = Duplicates; analyzed for Appendix IX parameters (metals, pesticides/PCBs, herbicides, OP pesticides, dioxins, SVOAs, VOAs); cyanide, and hex-chrome, at DQO Level IV.

Samples analyzed using SW-846 methods (metals, pesticides/PCBs, SVOAs, VOAs) at DQO Level III. First-round samples also analyzed for cyanide.

**Analytes Detected in Groundwater
Fuel Distribution System**

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Area 8					
Semivolatile Organic Compounds (µg/L)					
Total PAHs	FDS08B	46	21	25/NL	NA
Acenaphthene	FDS08B	17	6	10/220	NA
Anthracene	FDS08B	2	ND	10/1100	NA
Fluoranthene	FDS08B	6	4	10/150	NA
Fluorene	FDS08B	9	4	10/150	NA
2-Methylnaphthalene	FDS08B	2	2	10/150	NA
Phenanthrene	FDS08B	6	5	10/150	NA
Pyrene	FDS08B	4	2	10/110	NA
Benzoic acid	FDS08B	2	1	NL/15000	NA
Benzyl alcohol	FDS08C	ND	3	NL/1100	NA
Butylbenzylphthalate	FDS08C	ND	5	NL/730	NA
Dibenzofuran	FDS08B	4	2	NL/15	NA
Di-n-butylphthalate	FDS08C	ND	1	NL/370	NA
Inorganics (µg/L)					
Aluminum (Al)	FDS08A	8900	381	NL/3700	692
	FDS08B	682	116		
	FDS08C	ND	72		
Antimony (Sb)	FDS08B	ND	2.7	NL/1.5	4.85
Arsenic (As)	FDS08A	20.6	16.4	50/4.5E-02	17.8
	FDS08B	6.5	6.6		
	FDS08C	3.4	3.8		
Barium (Ba)	FDS08A	54.4	22.2	2000/260	31
	FDS08B	179	89.8		
	FDS08C	131	72.6		
Beryllium (Be)	FDS08A	1.3	ND	NL/1.6E-02	ND
	FDS08C	0.66	ND		
Calcium (Ca)	FDS08A	88100	76500	NL/NL	NL
	FDS08B	83800	90000		
	FDS08C	170000	244000		
Chromium (Cr)	FDS08A	18.9	ND	100/18	3.88
	FDS08B	4.8	2.3		
Cobalt (Co)	FDS08A	3.1	ND	NL/220	1.45
	FDS08B	3.5	2.8		
	FDS08C	2.0	0.85		
Copper (Cu)	FDS08A	6.4	2.3	NL/13000	8.33

**Analytes Detected in Groundwater
Fuel Distribution System**

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Iron (Fe)	FDS08A	15500	8630	NL/NL	NL
	FDS08B	3040	23800		
	FDS08C	828	1445		
Lead (Pb)	FDS08A	8.4	ND	15/15	4.6
Magnesium (Mg)	FDS08A	41900	37600	NL/NL	NL
	FDS08B	160000	157000		
	FDS08C	169000	127500		
Manganese (Mn)	FDS08A	304	275	NL/84	2906
	FDS08B	386	561		
	FDS08C	332	435		
Nickel (Ni)	FDS08A	8	1	NL/73	4.08
	FDS08B	13	1.6		
	FDS08C	5.8	0.88		
Potassium (K)	FDS08A	20500	20900	NL/NL	NL
	FDS08B	71500	63800		
	FDS08C	68600	51750		
Silver (Ag)	FDS08C	ND	1.4	5/18	1.65
Sodium (Na)	FDS08A	114000	59000	NL/NL	NL
	FDS08B	1960000	1850000		
	FDS08C	1210000	598000		
Thallium (Tl)	FDS08A	4.1	ND	NL/0.29	ND
	FDS08B	5.8	7.8		
	FDS08C	8.4	ND		
Vanadium (V)	FDS08A	22.9	4.5	NL/26	15.4
	FDS08B	13.1	6.6		
	FDS08C	2.8	18.1		
Zinc (Zn)	FDS08A	36	ND	NL/1100	15.6
Area 11					
Volatile Organic Compounds (µg/L)					
Chloromethane	619003	8.0	ND	NL/1.4	NA
Toluene	FDS11C	1	ND	1000/75	NA
Semivolatile Organic Compounds (µg/L)					
Total PAHs	FDS11A	1	2	25/NL	NA
	619003	13	1		
Acenaphthene	FDS11A	1.0	2.0	10/220	NA
	619003	2.0	ND		
Fluorene	619003	4.0	ND	10/150	NA
2-Methylnaphthalene	619003	3.0	ND	10/150	NA
Naphthalene	619003	2.0	1.0	10/150	NA

**Analytes Detected in Groundwater
Fuel Distribution System**

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Semivolatile Organic Compounds (µg/L)					
Phenanthrene	619003	2.0	ND	10/150	NA
Aniline	FDS11C	5	NT	NL/1	NA
Benzoic Acid	FDS11A	7	ND	NL/15000	NA
	FDS11C	ND	19		
Dibenzofuran	619003	2.0	ND	NL/15	NA
4-Methylphenol (p-Cresol)	FDS11C	ND	2.0	NL/18	NA
	619003	6.0	ND		
Dioxin (pg/L)					
Dioxin (2,3,7,8-TCDD TEQs ¹)	FDS11C	0.1694	NT	NL/0.45	NA
Inorganics (µg/L)					
Aluminum (Al)	FDS11A	209	395	NL/3700	692
	FDS11B	174	86.2		
	FDS11C	466	169		
	619003	233	10.3		
Antimony (Sb)	FDS11A	5.1	ND	NL/1.5	4.85
	FDS11B	4.2	ND		
	FDS11C	4.0	ND		
	619003	ND	4.9		
Arsenic (As)	FDS11A	2.9	ND	50/4.5E-02	17.8
	FDS11C	3.2	2.9		
	619003	3.0	8.0		
Barium (Ba)	FDS11A	39.8	27.9	2000/260	31
	FDS11B	68.9	54		
	FDS11C	57.8	51.1		
	619003	92.2	69.2		
Beryllium (Be)	619003	ND	0.39	NL/0.016	ND
Calcium (Ca)	FDS11A	101000	105000	NL/NL	NL
	FDS11B	93200	84500		
	FDS11C	125500	77800		
	619003	205000	200000		
Chromium (Cr)	FDS11A	0.96	1	100/18	3.88
	FDS11B	0.92	ND		
	FDS11C	1.1	ND		
	619003	1.0	1.5		
Cobalt (Co)	619003	ND	1.4	NL/220	1.45
Cyanide (CN)	FDS11B	3.2	NT	NL/73	3.8
	FDS11C	2.2	NT		
Iron (Fe)	FDS11A	2260	2920	NL/NL	NL
	FDS11B	15800	17300		
	FDS11C	7690	7120		
	619003	32000	17000		

**Analytes Detected in Groundwater
Fuel Distribution System**

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Magnesium (Mg)	FDS11A	34000	28500	NL/NL	NL
	FDS11B	67900	54100		
	FDS11C	191500	99650		
	619003	356000	497000		
Manganese (Mn)	FDS11A	300	348	NL/84	2,906
	FDS11B	913	814		
	FDS11C	527	500		
	619003	1420	702		
Mercury (Hg)	FDS11C	ND	0.11	2/1.1	ND
Nickel (Ni)	FDS11A	0.96	ND	NL/73	4.08
	FDS11B	3	ND		
	FDS11C	1	ND		
	619003	ND	1.5		
Potassium (K)	FDS11A	27300	18300	NL/NL	NL
	FDS11B	38200	31200		
	FDS11C	54050	39650		
	619003	163000	158000		
Sodium (Na)	FDS11A	380000	185000	NL/NL	NL
	FDS11B	587000	433000		
	FDS11C	908000	1030000		
	619003	3840000	4600000		
Thallium (Tl)	619003	6.6	ND	NL/0.29	ND
Tin (Sn)	FDS11C	3.3	ND	NL/2200	ND
Vanadium (V)	FDS11A	0.67	ND	NL/26	15.4
	FDS11B	ND	ND		
	FDS11C	0.67	ND		
	619003	ND	7.5		
Areas 12, 13, & 14					
Semivolatile Organic Compounds (µg/L)					
Total PAHs	FDS13A	1	5	25/NL	NA
2-Methylnaphthalene	FDS13A	1	5	10/150	NA
4-Nitrophenol	FDS14A	ND	1	NL/230	NA
Benzoic acid	FDS13A	2	ND	NL/15000	NA
	FDS13B	2	ND		
	FDS14A	ND	2		
	FDS14B	ND	1		

**Analytes Detected in Groundwater
Fuel Distribution System**

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Aluminum (Al)	FDS12A	514	288	NL/3700	692
	FDS12B	ND	213		
	FDS13A	1360	692		
	FDS13B	787	74.4		
	FDS13C	1730	1600		
	FDS13D	1850	2820		
	FDS13E	215	1290		
	FDS14A	ND	2940		
	FDS14B	ND	201		
	FDS14C	738	250		
	GDG002	176	ND		
Antimony (Sb)	FDS13E	3.4	ND	NL/1.5	4.85
	GDG002	ND	3.8		
Arsenic (As)	FDS12A	6.55	22.95	50/0.045	17.8
	FDS12B	28	49.3		
	FDS13A	27	210		
	FDS13B	5.2	16.8		
	FDS13C	3.9	6		
	FDS13D	ND	16.7		
	FDS13E	22.5	29.9		
	FDS14A	50.3	21.8		
	FDS14B	6.9	22.5		
	FDS14C	14	24.9		
	GDG002	7.8	10		
Barium (Ba)	FDS12A	268	196.5	2000/260	31
	FDS12B	78.9	70.4		
	FDS13A	138	28.1		
	FDS13B	144	29.8		
	FDS13C	27.3	17		
	FDS13D	35.6	31.9		
	FDS13E	32.9	30.4		
	FDS14A	45.2	59.6		
	FDS14B	52	46.2		
	FDS14C	51.5	33.1		
	GDG002	13.6	17.4		
Beryllium (Be)	FDS13B	.45	ND	NL/0.016	ND
	FDS13C	.53	ND		
	FDS14C	.64	ND		
Cadmium (Cd)	FDS12A	ND	.46	5/1.8	0.53
	FDS12B	ND	.52		
	FDS13A	ND	.44		
	FDS13C	ND	.68		
	FDS14A	ND	.31		
	FDS14B	ND	.41		
	GDG002	ND	.4		
Calcium (Ca)	FDS12A	274500	215500	NL/NL	NL
	FDS12B	172000	160000		
	FDS13A	161000	155000		
	FDS13B	197000	185000		
	FDS13C	69800	49400		
	FDS13D	8930	3580		
	FDS13E	155000	161000		
	FDS14A	177000	137000		
	FDS14B	127000	137000		
	FDS14C	201000	151000		
	GDG002	91400	90700		

**Analytes Detected in Groundwater
Fuel Distribution System**

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Chromium (Cr)	FDS12A	1.2	ND	100/18	3.88
	FDS12B	.82	ND		
	FDS13A	4.2	1.9		
	FDS13B	2.6	1.9		
	FDS13C	1.3	2.9		
	FDS13D	3.6	5.3		
	FDS13E	ND	3.3		
	FDS14A	2	9.6		
	FDS14B	4.3	2.8		
	FDS14C	1.4	2.4		
Cobalt (Co)	FDS12A	17.85	18.7	NL/220	1.45
	FDS12B	31	29.6		
	FDS13A	4.1	ND		
	FDS13B	3.1	1.9		
	FDS13C	29	23.4		
	FDS13D	3.4	1.4		
	FDS14A	1.9	2.1		
	FDS14B	3	1.6		
Copper (Cu)	FDS14C	1.6	.98	NL/13000	8.33
	FDS13A	5.2	ND		
	FDS13B	ND	2.2		
	FDS13D	ND	1.8		
	FDS14A	ND	3.7		
	FDS14B	3.8	ND		
Cyanide (CN)	FDS14C	5	ND	NL/73	3.8
	FDS13E	2.6	NT		
	FDS14B	2.2	NT		
Iron (Fe)	FDS14C	8.4	NT	NL/NL	NL
	FDS12A	10800	19850		
	FDS12B	18500	32200		
	FDS13A	14700	37200		
	FDS13B	2110	9150		
	FDS13C	73800	64500		
	FDS13D	4640	8280		
	FDS13E	10700	19000		
	FDS14A	20100	15600		
	FDS14B	4240	25600		
Lead (Pb)	FDS14C	2830	4930	15/15	4.6
	GDG002	28200	35700		
	FDS13A	ND	1		
	FDS13D	ND	1.9		
	FDS13E	ND	1.3		
Magnesium (Mg)	FDS14A	ND	3.5	NL/NL	NL
	FDS12A	58000	53400		
	FDS12B	106000	112000		
	FDS13A	203000	75700		
	FDS13B	428000	214000		
	FDS13C	153000	113000		
	FDS13D	6130	2730		
	FDS13E	131000	137000		
	FDS14A	257000	281000		
	FDS14B	266000	217000		
	FDS14C	170000	197000		
	GDG002	100000	81000		

**Analytes Detected in Groundwater
Fuel Distribution System**

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Manganese (Mn)	FDS12A	3650	3180	NL/84	2906
	FDS12B	3370	3240		
	FDS13A	1370	2480		
	FDS13B	286	292		
	FDS13C	1680	1300		
	FDS13D	163	73.7		
	FDS13E	1540	1660		
	FDS14A	607	354		
	FDS14B	329	405		
	FDS14C	3360	1510		
	GDG002	2630	2820		
Nickel (Ni)	FDS12A	9.2	4.85	NL/73	4.08
	FDS12B	9.6	6.2		
	FDS13A	11	ND		
	FDS13B	7.7	4		
	FDS13C	10.5	7.9		
	FDS13D	4.8	2.2		
	FDS13E	.94	.82		
	FDS14A	ND	4.8		
	FDS14B	7.7	1.4		
	FDS14C	ND	2.3		
	GDG002	2	ND		
Potassium (K)	FDS12A	7140	5935	NL/NL	NL
	FDS12B	41200	43900		
	FDS13A	75200	42100		
	FDS13B	123000	86500		
	FDS13C	40300	30300		
	FDS13D	3610	2910		
	FDS13E	57400	67000		
	FDS14A	91500	109000		
	FDS14B	90000	81600		
	FDS14C	63100	94300		
	GDG002	46400	49800		
Selenium (Se)	GDG002	ND	4.1	50/18	4.3
Silver (Ag)	GDG002	1.7	ND	5/18	1.65
Sodium (Na)	FDS12A	427000	388000	NL/NL	NL
	FDS12B	876000	1010000		
	FDS13A	1850000	425000		
	FDS13B	3860000	2080000		
	FDS13C	1620000	1260000		
	FDS13D	163000	104000		
	FDS13E	538000	795000		
	FDS14A	1970000	2510000		
	FDS14B	2240000	2020000		
	FDS14C	1030000	1750000		
	GDG002	694000	576000		
Thallium (Tl)	FDS12A	4.5	ND	NL/0.29	ND
	FDS12B	3.2	ND		
	FDS13A	5.7	ND		
	FDS13B	7.1	ND		
	FDS13D	4.2	ND		
	FDS14A	3.5	ND		
	FDS14B	3.2	ND		
	FDS14C	5.3	ND		

**Analytes Detected in Groundwater
Fuel Distribution System**

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Vanadium (V)	FDS12A	1.35	ND	NL/26	15.4
	FDS13A	4.7	5.1		
	FDS13B	9.1	20.5		
	FDS13C	1.6	2.9		
	FDS13D	3.7	6.1		
	FDS13E	3.7	5.3		
	FDS14A	5	20.2		
	FDS14B	8.4	13.2		
	FDS14C	5.4	17.3		
GDG002	2.7	3.1			
Zinc (Zn)	FDS12A	ND	8.4	NL/1100	15.6
	FDS12B	ND	16.3		
	FDS13A	ND	7.8		
	FDS13C	ND	21.7		
	FDS13D	ND	12.9		
FDS14A	ND	10.4			
Area 15					
Volatile Organic Compounds (µg/L)					
Toluene	FDS15A	3	ND	1000/75	NA
Chlorobenzene	FDS15A	6	ND	NL/3.9	NA
Semivolatile Organic Compounds (µg/L)					
Phenol	FDS15A	1	ND	NL/2200	NA
4-Methylphenol (p-cresol)	FDS15A	23	2	NL/18	NA
Benzoic acid	FDS15A	6	ND	NL/15000	NA
Pesticides/PCBs (µg/L)					
beta-BHC	FDS15A	0.057	ND	NL/0.037	NA
Inorganics (µg/L)					
Aluminum (Al)	FDS15A	100	503	NL/3700	692
	FDS15B	3,010	209		
	FDS15C	962	474		
Antimony (Sb)	FDS15C	3.5	ND	NL/1.5	4.85
Arsenic (As)	FDS15A	19.4	26.7	50/0.045	17.8
	FDS15B	4.1	4.6		
Barium (Ba)	FDS15A	55.2	94.5	2000/260	31
	FDS15B	68.6	70.6		
	FDS15C	159	153		
Calcium (Ca)	FDS15A	126000	235000	NL/NL	NL
	FDS15B	98800	119000		
	FDS15C	268000	284000		
Chromium (Cr)	FDS15A	0.92	1.5	100/18	3.88
	FDS15B	4.7	ND		
	FDS15C	1.9	ND		

Analytes Detected in Groundwater Fuel Distribution System					
Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Cobalt (Co)	FDS15B	8.1	6.8	NL/220	1.45
	FDS15C	1.3	ND		
Copper (Cu)	FDS15A	3.6	ND	NL/13000	8.33
Cyanide (CN)	FDS15A	3	NT	NL/73	3.8
	FDS15B	7	NT		
Iron (Fe)	FDS15A	4920	6620	NL/NL	NL
	FDS15B	2060	675		
	FDS15C	1920	3040		
Magnesium (Mg)	FDS15A	12200	15800	NL/NL	NL
	FDS15B	26200	22800		
	FDS15C	19300	14000		
Manganese (Mn)	FDS15A	721	515	NL/84	2906
	FDS15B	1050	813		
	FDS15C	806	465		
Nickel (Ni)	FDS15A	3.7	0.84	NL/73	4.08
	FDS15B	3.2	1.6		
	FDS15C	1.7	0.9		
Potassium (K)	FDS15A	10800	5130	NL/NL	NL
	FDS15B	7410	8050		
	FDS15C	3440	3450		
Sodium (Na)	FDS15A	78300	157000	NL/NL	NL
	FDS15B	92400	158000		
	FDS15C	117000	114000		
Thallium (Tl)	FDS15C	3.3	ND	NL/0.29	ND
Vanadium (V)	FDS15A	1.3	1.6	NL/26	15.4
	FDS15B	6	1.1		
	FDS15C	1.9	1.6		

Notes:

NL = Not listed

NA = Not applicable

ND = Not detected

NT = Not taken

µg/L = Micrograms per liter

pg/L = Picograms per liter

1 = Calculated from methods described in USEPA Interim Supplemental Guidance to RAGS: Human Health Risk Assessment, Bulletin 2 (USEPA, 1995).

RBSLs from the South Carolina Risk-Based Corrective Action for Petroleum Releases (SCDHEC, January 5, 1998) and tap water RBCs (THQ=0.1) from Risk Based Concentration Table (USEPA, October 22, 1997) were used as reference concentrations.

Bolded concentration exceed RBSL or the Tap Water RBC (if no RBSL is available).

All background values for Zone G are based on twice the means of the grid sample concentrations. Background values for groundwater are based on two sampling rounds in two wells at each depth.

DPT Soil and Groundwater Samples and Analyses

Sample Location	Sample Identifier	Medium	Date Collected	Analyses
Area 19				
P001	F19SP00106	Soil	1/21/99	VOCs, SVOCs
	F19GP00101	Groundwater	4/12/99	"
P002	F19SP00205	Soil	1/21/99	VOCs, SVOCs
	F19GP00201	Groundwater	4/12/99	"
P003	F19SP00305	Soil	1/21/99	VOCs, SVOCs
	F19GP00301	Groundwater	4/12/99	"
P004	F19SP00406	Soil	1/22/99	VOCs, SVOCs
	F19GP00401	Groundwater	4/12/99	"
P005	F19SP00505	Soil	1/21/99	VOCs, SVOCs
	F19GP00501	Groundwater	4/12/99	"
P006	F19SP00604	Soil	1/21/99	VOCs, SVOCs
P007	F19SP00706	Soil	1/21/99	VOCs, SVOCs
P009	F19SP00909	Soil	5/07/99	VOCs, SVOCs
	F19GP00901	Groundwater	5/10/99	"
P010	F19SP01005	Soil	5/07/99	VOCs, SVOCs
	F19GP01001	Groundwater	5/10/99	"
P011	F19SP01105	Soil	5/07/99	VOCs, SVOCs
	F19GP01101	Groundwater	5/10/99	"
P012	F19SP01205	Soil	5/07/99	VOCs, SVOCs
	F19GP01201	Groundwater	5/10/99	"
P013	F19SP01311	Soil	6/23/99	VOCs, SVOCs
	F19GP01301	Groundwater	6/24/99	"
P014	F19SP01407	Soil	6/23/99	VOCs, SVOCs
	F19GP01401	Groundwater	6/24/99	"
P015	F19SP01507	Soil	6/23/99	VOCs, SVOCs
	F19GP01501	Groundwater	6/28/99	"
P016	F19SP01611	Soil	6/23/99	VOCs, SVOCs
	F19GP01601	Groundwater	6/28/99	"
P017	F19SP01711	Soil	6/23/99	VOCs, SVOCs
	F19GP01701	Groundwater	6/28/99	"
P018	F19SP01811	Soil	6/23/99	VOCs, SVOCs
	F19GP01801	Groundwater	6/28/99	"
P019	F19SP01912	Soil	6/23/99	VOCs, SVOCs
	F19GP01901	Groundwater	6/28/99	"
P020	F19SP02010	Soil	6/23/99	VOCs, SVOCs
	F19GP02001	Groundwater	6/28/99	"
Area 20				
P001	F20SP00111	Soil	1/22/99	VOCs, SVOCs
	F20GP00101	Groundwater	1/29/99	VOCs, SVOCs, Metals
P002	F20SP00206	Soil	1/22/99	VOCs, SVOCs
	F20GP00201	Groundwater	1/29/99	VOCs, SVOCs, Metals

DPT Soil and Groundwater Samples and Analyses

Sample Location	Sample Identifier	Medium	Date Collected	Analyses
P003	F20SP00308	Soil	1/22/99	VOCs, SVOCs
	F20GP00301	Groundwater	1/29/99	VOCs, SVOCs, Metals
P004	F20SP00403	Soil	1/29/99	VOCs, SVOCs
	F20GP00401	Groundwater	1/29/99	VOCs, SVOCs, Metals
P005	F20SP00511	Soil	1/26/99	VOCs, SVOCs
	F20GP00501	Groundwater	1/29/99	VOCs, SVOCs, Metals
P006	F20SP00606	Soil	1/27/99	VOCs, SVOCs
	F20GP00601	Groundwater	1/29/99	VOCs, SVOCs, Metals
P007	F20SP00719	Soil	1/26/99	VOCs, SVOCs
P008	F20GP00801	Groundwater	1/29/99	VOCs, SVOCs, Metals
P009	F20SP00921	Soil	1/27/99	VOCs, SVOCs
P010	F20SP01002	Soil	1/27/99	VOCs, SVOCs
P012	F20SP01210	Soil	1/27/99	VOCs, SVOCs
P013	F20SP01309	Soil	1/27/99	VOCs, SVOCs
P014	F20SP01404	Soil	1/28/99	VOCs, SVOCs
P015	F20SP01509	Soil	1/28/99	VOCs, SVOCs
P016	F20SP01609	Soil	1/28/99	VOCs, SVOCs
P017	F20SP01709	Soil	1/27/99	VOCs, SVOCs
P018	F20GP01801	Groundwater	5/07/99	VOCs, SVOCs
P019	F20SP01906	Soil	5/07/99	VOCs, SVOCs
	F20GP01901	Groundwater	5/07/99	"
P020	F20SP02006	Soil	5/07/99	VOCs, SVOCs
	F20GP02001	Groundwater	5/07/99	"
P021	F20SP02106	Soil	5/07/99	VOCs, SVOCs
P022	F20SP02204	Soil	5/07/99	VOCs, SVOCs
	F20GP02201	Groundwater	5/10/99	"
P023	F20SP02307	Soil	5/07/99	VOCs, SVOCs
P024	F20SP02407	Soil	5/07/99	VOCs, SVOCs
	F20GP02401	Groundwater	5/10/99	"
P025	F20SP02505	Soil	5/07/99	VOCs, SVOCs
	F20GP02501	Groundwater	5/10/99	"
P026	F20SP02608	Soil	5/07/99	VOCs, SVOCs
	F20GP02601	Groundwater	5/10/99	"
P027	F20SP02708	Soil	5/07/99	VOCs, SVOCs
	F20GP02701	Groundwater	5/11/99	"
P028	F20GP02801	Groundwater	5/11/99	VOCs
P029	F20SP02907	Soil	5/07/99	VOCs, SVOCs
	F20GP02901	Groundwater	5/11/99	"
P030	F20SP03005	Soil	5/07/99	VOCs, SVOCs
	F20GP03001	Groundwater	5/11/99	"

DPT Soil and Groundwater Samples and Analyses

Sample Location	Sample Identifier	Medium	Date Collected	Analyses
P031	F20GP03101	Groundwater	6/24/99	VOCs, SVOCs
P032	F20GP03201	Groundwater	6/24/99	VOCs, SVOCs
P033	F20GP03301	Groundwater	6/24/99	VOCs

Notes:

Sample P008 was not collected

Sample P011 was not collected

SVOCs = Semivolatile Organic Compounds

VOCs = Volatile Organic Compounds

Summary of DPT Soil Analytical Results

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Area 19				
Volatile Organic Compounds (µg/kg)				
Benzene	F19SP006	8	5	Yes
	F19SP012	18		Yes
	F19SP013	26		Yes
Ethylbenzene	F19SP006	83	1,260	No
	F19SP012	7,700		Yes
	F19SP013	38		No
	F19SP014	2		No
	F19SP015	300		No
Xylene (Total)	F19SP006	12	42,471	No
	F19SP012	780		No
	F19SP014	3		No
	F19SP020	1		No
Semivolatile Organic Compounds (µg/kg)				
Total Naphthalenes	F19SP001	450	210	Yes
	F19SP006	3,000		Yes
	F19SP012	159,855		Yes
	F19SP013	93,000		Yes
	F19SP014	6,800		Yes
	F19SP015	7,100		Yes
	F19SP016	1,080		Yes
	F19SP020	10,300		Yes
2-Methylnaphthalene	F19SP01205	112,855	NL	NA
	F19SP013	75,000		
	F19SP014	6,800		
	F19SP015	5,700		
	F19SP016	920		
	F19SP020	1,200		
Naphthalene	F19SP001	450	210	Yes
	F19SP006	3,000		Yes
	F19SP012	47,000		Yes
	F19SP013	18,000		Yes
	F19SP015	1,400		Yes
	F19SP016	160		No
	F19SP020	9,100		Yes
Benzo(a)anthracene	F19SP001	140	73,084	No
	F19SP004	6,300		No
	F19SP006	1,900		No
	F19SP009	75		No
	F19SP010	56		No
	F19SP012	570		No
	F19SP013	600		No
	F19SP014	2,100		No
Benzo(a)pyrene	F19SP014	2,400	NL	NA
Benzo(b)fluoranthene	F19SP001	110	29,097	No
	F19SP004	5,500		No
	F19SP006	1,800		No
	F19SP009	62		No
	F19SP010	58		No
	F19SP012	390		No
	F19SP014	2,500		No

Summary of DPT Soil Analytical Results

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Semivolatile Organic Compounds (µg/kg)				
Benzo(g,h,i)perylene	F19SP014	940	NL	NA
Benzo(k)fluoranthene	F19SP001	120	231,109	No
	F19SP004	5,600		No
	F19SP006	2,000		No
	F19SP009	54		No
	F19SP010	66		No
	F19SP014	2,400		No
Chrysene	F19SP001	240	12,998	No
	F19SP004	6,300		No
	F19SP006	3,200		No
	F19SP009	120		No
	F19SP010	71		No
	F19SP012	1,200		No
	F19SP013	1,100		No
	F19SP014	3,000		No
Acenaphthene	F19SP020	1,900	NL	NA
Anthracene	F19SP014	910	NL	NA
Dibenzofuran	F19SP020	790	NL	NA
Fluoranthene	F19SP014	4,900	NL	NA
	F19SP020	160		
Fluorene	F19SP013	7,100	NL	NA
	F19SP014	1,600		
	F19SP015	720		
	F19SP016	150		
	F19SP020	880		
Indeno(1,2,3-cd)pyrene	F19SP014	1,000	NL	NA
Phenanthrene	F19SP013	14,000	NL	NA
	F19SP014	5,700		
	F19SP015	1,200		
	F19SP020	1,300		
Pyrene	F19SP014	5,900	NL	NA
	F19SP020	100		
bis(2-ethylhexyl)phthalate	F19SP015	25	NL	NA
	F19SP016	23		
Area 20				
Volatile Organic Compounds (µg/kg)				
Benzene	F20SP014	38	5	Yes
	F20SP023	3		No
Ethylbenzene	F20SP014	11	1,260	No
	F20SP024	1		No
Toluene	F20SP014	1	1,622	No
	F20SP021	2		No
	F20SP030	2		No
Xylene (Total)	F20SP001	1	42,471	No
	F20SP014	13		No
	F20SP023	5		No

Summary of DPT Soil Analytical Results

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Semivolatile Organic Compounds ($\mu\text{g/kg}$)				
Total Naphthalenes	F20SP001	390	210	Yes
	F20SP003	76		No
	F20SP012	171		No
	F20SP014	41,012		Yes
	F20SP015	79		No
	F20SP017	604		Yes
	F20SP019	624		Yes
	F20SP020	56		No
	F20SP023	660		Yes
	F20SP024	600		Yes
	F20SP029	95		No
	F20SP030	89		No
Naphthalene	F20SP001	390	210	Yes
	F20SP003	76		No
	F20SP014	4,000		Yes
	F20SP015	79		No
	F20SP017	260		Yes
	F20SP020	30		No
	F20SP023	660		Yes
	F20SP024	600		Yes
	F20SP029	29		No
	F20SP030	43		No
2-Methylnaphthalene	F20SP012	171	NL	NA
	F20SP014	37,012		
	F20SP015	121		
	F20SP017	344		
	F20SP019	624		
	F20SP020	26		
	F20SP029	66		
	F20SP030	46		
Benzo(a)anthracene	F20SP001	1,900	73,084	No
	F20SP003	580		No
	F20SP004	60		No
	F20SP005	120		No
	F20SP006	100		No
	F20SP012	190		No
	F20SP014	220		No
	F20SP015	660		No
	F20SP016	1,200		No
	F20SP017	3,900		No
	F20SP019	220		No
	F20SP020	210		No
	F20SP021	200		No
	F20SP022	160		No
	F20SP023	170		No
	F20SP024	40		No
	F20SP025	120		No
	F20SP027	35		No
	F20SP029	95		No
	F20SP030	200		No

Summary of DPT Soil Analytical Results

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Semivolatile Organic Compounds (µg/kg)				
Benzo(b)fluoranthene	F20SP001	730	29,097	No
	F20SP003	710		No
	F20SP004	60		No
	F20SP005	95		No
	F20SP006	95		No
	F20SP012	48		No
	F20SP014	220		No
	F20SP015	790		No
	F20SP016	1,200		No
	F20SP017	3,000		No
	F20SP020	100		No
	F20SP021	100		No
	F20SP022	140		No
	F20SP023	79		No
	F20SP024	46		No
	F20SP025	110		No
	F20SP027	41		No
	F20SP029	96		No
	F20SP030	140		No
Benzo(k)fluoranthene	F20SP001	590	231,109	No
	F20SP003	560		No
	F20SP004	43		No
	F20SP005	73		No
	F20SP006	81		No
	F20SP012	57		No
	F20SP014	140		No
	F20SP015	720		No
	F20SP016	920		No
	F20SP017	2,800		No
	F20SP020	110		No
	F20SP021	110		No
	F20SP022	140		No
	F20SP023	53		No
	F20SP024	30		No
	F20SP025	120		No
	F20SP027	29		No
	F20SP029	85		No
	F20SP030	170		No
Chrysene	F20SP001	3,200	12,998	No
	F20SP003	1,000		No
	F20SP004	64		No
	F20SP005	220		No
	F20SP006	180		No
	F20SP012	250		No
	F20SP013	52		No
	F20SP014	410		No
	F20SP015	740		No
	F20SP016	1,200		No
	F20SP017	3,700		No
	F20SP019	440		No
	F20SP020	220		No
	F20SP021	260		No
	F20SP022	190		No
	F20SP023	310		No
	F20SP024	55		No
	F20SP025	150		No
	F20SP027	45		No
	F20SP029	180		No
	F20SP030	280		No

Notes:

NL = Not listed

NA = Not applicable

$\mu\text{g/kg}$ = Micrograms per kilogram

RBSLs for groundwater protection from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) were used as reference concentrations.

Bolded concentrations exceed RBSLs.

Summary of DPT Groundwater Analytical Results

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Area 19				
Volatile Organic Compounds (µg/L)				
Benzene	F19GP009	8	5	Yes
	F19GP013	32		Yes
	F19GP014	2		No
Ethylbenzene	F19GP001	1	700	No
	F19GP012	44		No
	F19GP013	40		No
Xylene (Total)	F19GP012	2	10,000	No
	F19GP013	13		No
	F19GP015	2		No
Semivolatile Organic Compounds (µg/L)				
Total PAHs	F19GP004	2.8	25	No
	F19GP009	46		Yes
	F19GP010	2.4		No
	F19GP011	7.8		No
	F19GP012	354,216		Yes
	F19GP013	305		Yes
	F19GP014	133		Yes
	F19GP015	1,551		Yes
	F19GP016	161		Yes
	F19GP017	7		No
	F19GP018	41		Yes
	F19GP019	22		No
	F19GP020	464		Yes
2-Methylnaphthalene	F19GP009	43.6	10	Yes
	F19GP010	1.58		No
	F19GP011	4.84		No
	F19GP012	260,816		Yes
	F19GP013	190		Yes
	F19GP014	130		Yes
	F19GP015	1,300		Yes
	F19GP016	140		Yes
	F19GP017	7		No
	F19GP018	5		No
	F19GP019	10		Yes
	F19GP020	15		Yes
Naphthalene	F19GP009	2	10	No
	F19GP010	0.8		No
	F19GP011	3		No
	F19GP012	91,000		Yes
	F19GP013	100		Yes
	F19GP015	240		Yes
	F19GP016	18		Yes
	F19GP018	16		Yes
	F19GP019	12		Yes
	F19GP020	440		Yes
2,4-Dimethylphenol	F19GP020	12	NL	NA
Benzo(a)anthracene	F19GP013	5	10	No
	F19GP014	1		No
	F19GP016	0.8		No
	F19GP018	5		No
	F19GP020	12		No

Summary of DPT Groundwater Analytical Results

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Semivolatile Organic Compounds (µg/L)				
Benzo(a)pyrene	F19GP013	2	NL	NA
	F19GP014	0.6		
	F19GP018	3		
Benzo(b)fluoranthene	F19GP004	0.8	10	No
	F19GP013	2		No
	F19GP016	0.7		No
	F19GP018	2		No
	F19GP020	2		No
Benzo(k)fluoranthene	F19GP004	1	10	No
	F19GP018	3		No
	F19GP020	2		No
Benzo(g,h,i)perylene	F19GP013	0.8	NL	NA
Chrysene	F19GP004	1	10	No
	F19GP012	2,400		Yes
	F19GP013	8		No
	F19GP014	2		No
	F19GP015	11		Yes
	F19GP016	1		No
	F19GP018	7		No
	F19GP020	3		No
Acenaphthene	F19GP013	24	NL	NA
	F19GP014	8		
	F19GP018	42		
	F19GP019	15		
	F19GP020	32		
Anthracene	F19GP018	10	NL	NA
	F19GP019	1		
	F19GP020	3		
Dibenzofuran	F19GP013	22	NL	NA
	F19GP014	8		
	F19GP015	42		
	F19GP018	17		
	F19GP019	5		
	F19GP020	11		
Fluoranthene	F19GP013	5	NL	NA
	F19GP014	2		
	F19GP018	22		
	F19GP019	1		
	F19GP020	6		
Fluorene	F19GP013	40	NL	NA
	F19GP014	16		
	F19GP015	130		
	F19GP016	20		
	F19GP017	2		
	F19GP018	24		
	F19GP019	7		
	F19GP020	14		

Summary of DPT Groundwater Analytical Results

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Semivolatile Organic Compounds (µg/L)				
Phenanthrene	F19GP013	73	NL	NA
	F19GP014	28		
	F19GP015	240		
	F19GP016	26		
	F19GP017	2		
	F19GP018	48		
	F19GP019	6		
	F19GP020	20		
Phenol	F19GP013	1	NL	NA
Pyrene	F19GP013	9	NL	NA
	F19GP014	3		
	F19GP016	3		
	F19GP018	17		
	F19GP020	6		
Bis(2-ethylhexyl)phthalate	F19GP013	3	NL	NA
	F19GP014	5		
	F19GP016	1		
	F19GP017	2		
	F19GP018	0.70		
	F19GP019	1		
	F19GP020	2		

Area 20

Volatile Organic Compound (µg/L)				
Benzene	F19GP005	2	5	No
Ethylbenzene	F19GP005	5	700	No
	F19GP008	5		No
Toluene	F19GP005	4	1,000	No
Xylene (Total)	F19GP005	21	10,000	No
	F19GP008	10		No
	F19GP024	4		No

Semivolatile Organic Compounds (µg/L)				
Total PAHs	F20GP001	14	25	No
	F20GP002	1		No
	F20GP003	19		No
	F20GP004	17		No
	F20GP005	53		Yes
	F20GP006	8		No
	F20GP008	1,438		Yes
	F20GP018	7		No
	F20GP022	3		No
	F20GP024	144		Yes
	F20GP025	44		Yes
	F20GP031	16		No

Summary of DPT Groundwater Analytical Results

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Semivolatile Organic Compounds (µg/L)				
2-Methylnaphthalene	F20GP001	13	10	Yes
	F20GP003	9.6		No
	F20GP004	10.9		Yes
	F20GP005	32.6		Yes
	F20GP006	3		No
	F20GP008	507		Yes
	F20GP018	0.53		No
	F20GP019	4		No
	F20GP020	6		No
	F20GP022	2		No
	F20GP024	127		Yes
Naphthalene	F20GP001	1	10	No
	F20GP002	1		No
	F20GP003	3		No
	F20GP004	6		No
	F20GP005	16		Yes
	F20GP006	5		No
	F20GP008	780		Yes
	F20GP018	0.60		No
	F20GP022	1		No
	F20GP024	9		No
Benzo(a)anthracene	F20GP003	2	10	No
	F20GP005	1		No
	F20GP008	55		Yes
	F20GP018	2		No
	F20GP024	2		No
	F20GP025	15		Yes
	F20GP031	4		No
Benzo(a)pyrene	F20GP031	4	NL	No
Benzo(b)fluoranthene	F20GP003	2	10	No
	F20GP005	1		No
	F20GP008	26		Yes
	F20GP018	1		No
	F20GP024	1		No
	F20GP025	10		No
	F20GP031	4		No
Benzo(k)fluoranthene	F20GP008	20	10	Yes
	F20GP018	0.50		No
	F20GP024	0.90		No
	F20GP025	6		No
	F20GP031	3		No
Benzo(g,h,i)perylene	F20GP031	3	NL	NA
Benzoic acid	F20GP031	2	NL	NA
	F20GP032	1		
Chrysene	F20GP003	2	10	No
	F20GP005	2		No
	F20GP008	50		Yes
	F20GP018	2		No
	F20GP024	4		No
	F20GP025	13		Yes
	F20GP031	5		No
Anthracene	F20GP031	2	NL	NA
Fluoranthene	F20GP031	11	NL	NA

Summary of DPT Groundwater Analytical Results

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Semivolatile Organic Compounds (µg/L)				
Fluorene	F20GP031	0.80	NL	NA
Indeno(1,2,3-cd)pyrene	F20GP031	2	NL	NA
Phenanthrene	F20GP031	5	NL	NA
Phenol	F20GP032	0.60	NL	NA
Pyrene	F20GP031	10	NL	NA
Bis(2-ethylhexyl)phthalate	F20GP031	2	NL	NA
	F20GP032	2		
Diethylphthalate	F20GP031	0.70	NL	NA
	F20GP032	0.60		
Di-n-butylphthalate	F20GP031	1	NL	NA
	F20GP032	0.50		

Notes:

NL = Not listed

NA = Not applicable

µg/L = Micrograms per liter

RBSLs from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) were used as reference concentrations.

Bolded concentrations exceed RBSL

Summary of Monitoring Well Analytical Results

Parameters	Location	Concentration	RBSL	Shallow Background	Exceed RBSL
Area 19					
Semivolatile Organic Compounds (µg/L)					
Benzoic acid	FDS19A	9	NL	NA	NA
	FDS19B	19			
	FDS19C	6			
	FDS19D	6			
	FDS19E	6			
	FDS19G	8			
bis(2-Ethylhexyl)phthalate	FDS19B	41	NL	NA	NA
Butylbenzylphthalate	FDS19B	1	NL	NA	NA
Di-n-butylphthalate	FDS19A	1	NL	NA	NA
	FDS19B	1			
	FDS19C	1			
	FDS19E	1			
	FDS19F	1			
Inorganics (µg/L)					
Arsenic (As)	FDS19A	13.2	50	17.8	No
	FDS19B	8.2			No
	FDS19C	4.1			No
	FDS19D	17			No
	FDS19E	3.3			No
	FDS19F	20.6			No
	FDS19G	5.2			No
Barium (Ba)	FDS19A	293	2,000	31	No
	FDS19B	217			No
	FDS19C	46.7			No
	FDS19D	42.7			No
	FDS19E	46.2			No
	FDS19F	81.8			No
	FDS19G	32.6			No
Chromium (Cr)	FDS19A	0.73	100	3.88	No
	FDS19B	1.9			No
	FDS19C	2.7			No
	FDS19D	1			No
	FDS19E	1.5			No
	FDS19F	3.1			No
	FDS19G	6.7			No
Lead (Pb)	FDS19C	4.9	15	4.6	No
	FDS19F	3.2			No
Area 20					
Semivolatile Organic Compounds (µg/L)					
Total PAHs	FDS20A	3	25	NA	No
	FDS20C	3			No
2-Methylnaphthalene	FDS20A	3	10	NA	No
	FDS20C	2			No
Naphthalene	FDS20C	1	10	NA	No
4-Chloro-3-methylphenol	FDS20A	1	NL	NA	NA

Summary of Monitoring Well Analytical Results

Parameters	Location	Concentration	RBSL	Shallow Background	Exceed RBSL
Semivolatile Organic Compounds (µg/L)					
4-Methylphenol	FDS20B	1	NL	NA	NA
	FDS20C	1			
	FDS20E	8			
4-Nitrophenol	FDS20C	1	NL	NA	NA
Acenaphthene	FDS20A	2	NL	NA	NA
	FDS20C	5			
	FDS20E	1			
	FDS20F	2			
Anthracene	FDS20A	1	NL	NA	NA
	FDS20C	1			
Benzoic acid	FDS20A	1.5	NL	NA	NA
	FDS20B	2			
	FDS20C	1			
	FDS20D	1			
	FDS20E	4			
Dibenzofuran	FDS20C	2	NL	NA	NA
Diethylphthalate	FDS20A	1	NL	NA	NA
Di-n-butylphthalate	FDS20A	1	NL	NA	NA
	FDS20B	1			
	FDS20C	0.6			
	FDS20D	1			
Fluoranthene	FDS20C	1	NL	NA	NA
Fluorene	FDS20C	4	NL	NA	NA
	FDS20F	1			
Pentachlorophenol	FDS20C	1	NL	NA	NA
Phenanthrene	FDS20A	1	NL	NA	NA
	FDS20B	1			
	FDS20C	7			
	FDS20E	2			
Phenol	FDS20A	1	NL	NA	NA
Pyrene	FDS20A	1	NL	NA	NA
	FDS20C	1			
Inorganics (µg/L)					
Arsenic (As)	FDS20A	5.5	50	17.8	No
	FDS20B	11.3			No
	FDS20C	13.4			No
	FDS20D	3.7			No
	FDS20E	15.8			No
Barium (Ba)	FDS20A	94.55	2,000	31	No
	FDS20B	142			No
	FDS20C	428			No
	FDS20D	79.3			No
	FDS20E	146			No
	FDS20F	45.4			No

Summary of Monitoring Well Analytical Results

Parameters	Location	Concentration	RBSL	Shallow Background	Exceed RBSL
Inorganics ($\mu\text{g/L}$)					
Cadmium (Cd)	FDS20C	1.2	5	0.53	No
	FDS20D	0.36			No
	FDS20E	0.89			No
Chromium (Cr)	FDS20A	1.15	100	3.88	No
	FDS20B	2			No
	FDS20C	3.9			No
	FDS20D	2.6			No
	FDS20E	2.4			No
	FDS20F	0.56			No
Lead (Pb)	FDS20B	2.2	15	15.4	No
	FDS20C	3.1			No

Notes:

NL = Not listed
 NA = Not applicable
 $\mu\text{g/L}$ = Micrograms per liter

RBSLs from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) were used as reference concentrations.

Bolded concentrations exceed RBSL.

SWMU 3
Soil Samples and Analyses

Boring Location	Sample Identifier	Sample Interval	Date Collected	Analyses	Remarks
003SB001	003SB00101 003SB00102	Upper Lower	8/29/96	Suite 1/cyanide, SVOCs	Pesticides, OP Pesticides collected 11/12/96
003SB002	003SB00201 003SB00202	Upper Lower	8/28/96	Suite 1/cyanide, pH	Pesticides, OP Pesticides collected 11/12/96
003SB003	003SB00301 003SB00302	Upper Lower	8/28/96	Suite 1/cyanide, pH	Pesticides, OP Pesticides collected 11/12/96
003SB004	003SB00401 003SB00402	Upper Lower	9/26/96	Suite 1	OP Pesticides collected 11/12/96
003SB005	003SB00501 003SB00502	Upper Lower	9/26/96	Suite 1	OP Pesticides collected 11/12/96
003SB006	003SB00601 003SB00602	Upper Lower	9/26/96	Suite 1	OP Pesticides collected 11/12/96
003SB007	003SB00701 003SB00702*	Upper	10/08/96	Suite 1 Suite 2	Lower interval not sampled due to obstruction. OP Pesticides not collected *Duplicate Sample
003SB008	003SB00801 003SB00802	Upper Lower	9/26/96	Suite 1	OP Pesticides collected 11/12/96
003SB009	003SB00901 003SB00902	Upper Lower	9/26/96	Suite 1	OP Pesticides collected 11/12/96
003SB010	003SB01001 003SB01002	Upper Lower	9/26/96	Suite 1	OP Pesticides collected 11/12/96
003SB011	003SB01101 003SB01102	Upper Lower	7/28/99	SW-846 pesticides	*Duplicate Sample
003SB012	003SB01201 003CB01201* 003SB01202	Upper Upper Lower	7/28/99	SW-846 pesticides	*Duplicate Sample
003SB013	003SB01301 003CB01301* 003SB01302	Upper Upper Lower	7/30/99	SW-846 pesticides	
003SB014	003SB01402	Lower	7/28/99	Suite 3	
003SB015	003SB01501 003SB01502	Upper Lower	12/17/99	pesticides only	
003SB016	003SB01601 003SB01602	Upper Lower	1/27/99	pesticides only	
003SB017	003SB01701 003SB01702	Upper Lower	1/27/99	pesticides only	
003SB018	003SB01801 003SB01802	Upper Lower	1/27/99	pesticides only	
003SB019	003SB01901 003SB01902	Upper Lower	1/27/99	pesticides only	

SWMU 3
Soil Samples and Analyses

Boring Location	Sample Identifier	Sample Interval	Date Collected	Analyses	Remarks
003SB020	003SB02001 003SB02002	Upper Lower	1/27/99	pesticides only	

Notes:

Suite 1 = SW-846 (metals, pesticides/PCBs, OP pesticides) at DQO Level III.
 Suite 2 = Appendix IX suite: SW-846 (metals, pesticides/PCBs, herbicides, OP pesticides, dioxins, SVOCs, VOCs); cyanide; hex-chrome at DQO Level IV.
 Suite 3 = SW-846 pesticides, SPLP pesticides/PCBs, Total Organic Carbon (TOC) at DQO Level III.
 * = Duplicate Sample

SWMU 3
Groundwater Sample and Analyses

Well Number	Well Depth	Sample Identifier	Date Sampled	Analyses	Remarks
003001	Shallow	00300101	11/21/96	Note 1	
003002	Shallow	00300201*	11/21/96	Note 1/2*	*Duplicate sample collected
003003	Shallow	00300301	11/21/96	Note 1	

Notes:

- 1 = SW-846 (metals, pesticides/PCBs, OP pesticides) at DQO Level III
- 2 = Appendix IX suite: SW-846 (metals, pesticides/PCBs, herbicides, OP pesticides, dioxins, SVOCs, VOCs); hex-chrome at DQO Level IV
- * = Duplicate sample collected

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
SWMU 3							
Volatile Organic Compounds (µg/kg)							
Acrolein	003B007	2	160000	NA	NT	867.40	NA
Semivolatile Organic Compounds (µg/kg)							
Butylbenzylphthalate	003B007	930	1600000	NA	NT	6103322.75	NA
Pesticides and PCBs (µg/kg)							
alpha-Chlordane	003B002	4.90	1800	NA	ND	2035.14	NA
	003B003	16000			5.5		
	003B007	2.40			ND		
	003B008	420			35		
	003B009	21			85		
	003B013	6.70			ND		
gamma-Chlordane	003B015	17	1800	NA	ND	4067.95	NA
	003B002	5.90			ND		
	003B003	22000			6.10		
	003B006	1.70			ND		
	003B007	2.65			ND		
	003B008	510			40		
	003B009	21			110		
	003B013	5.25			ND		
4,4'-DDD	003B015	23	2700	NA	ND	5082.41	NA
	003B003	420			ND		
	003B007	9.10			ND		
	003B012	3900			6100		
	003B013	250			7.60		
	003B016	17000			20		
	003B017	770			74		
	003B018	310000			190		
	003B019	17			8.10		
	003B020	66			ND		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Pesticides and PCBs (µg/kg)							
4,4'-DDE	003B001	3.50	1900	NA	ND	16226.39	NA
	003B002	81			ND		
	003B003	2600			ND		
	003B004	3.80			ND		
	003B005	25			ND		
	003B006	5			ND		
	003B007	14			ND		
	003B008	27			8		
	003B009	200			160		
	003B010	21			ND		
	003B011	72			ND		
	003B012	2150			1500		
	003B013	130			ND		
	003B015	770			ND		
	003B016	3600			8.2		
	003B017	410			ND		
	003B018	44000			60		
	003B019	130			ND		
	003B020	56			ND		
4,4'-DDT	003B002	65	1900	NA	ND	9547.19	NA
	003B003	570			ND		
	003B004	3.60			ND		
	003B005	19			ND		
	003B006	5.70			ND		
	003B007	95.50			ND		
	003B008	82			12		
	003B009	180			250		
	003B010	20			ND		
	003B011	71			20		
	003B012	89000			73000		
	003B013	875			27		
	003B015	220			ND		
	003B016	200000			240		
	003B017	7400			340		
	003B018	2500000			3700		
	003B019	340			180		
	003B020	360			39		
Dieldrin	003B007	3.65	40	NA	ND	1.65	NA
	003B009	12			ND		
Endosulfan I	003B013	5.7	47000	NA	ND	7093.81	NA

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Pesticides and PCBs (µg/kg)							
Endrin	003B002	8.60	2300	NA	ND	359.54	NA
	003B003	540			ND		
Heptachlor	003B003	520	140	NA	ND	8200.18	NA
	003B007	3			ND		
	003B008	210			9.0		
Heptachlor epoxide	003B002	3.1	70	NA	ND	241.85	NA
	003B009	5.9			15		
	003B015	49			ND		
	003B019	2.5			ND		
Aroclor-1248	003B003	28000	320	NA	ND	2243.95	NA
Dioxins (ng/kg)							
1234678-HpCDD	003B007	3.81	0.43	NA	NT	99.32	NA
234678-HxCDF	003B007	0.472	0.043	NA	NT	198.63	NA
OCDD	003B007	126	4.30	NA	NT	99.32	NA
TEQ	003B007	0.13	0.0043	NA	NT	NA	NA
Total Hepta-Dioxins	003B007	11.3	NA	NA	NT	NA	NA
Total Hexa-Dioxins	003B007	0.738	NA	NA	NT	NA	NA
pH (SU)							
pH	003B002	7.86	NA	NA	7.93	NA	NA
	003B003	6.89			7.18		
Inorganics (mg/kg)							
Aluminum (Al)	003B001	4200	7800	18700	5150	1740950	23600
	003B002	6330			4990		
	003B003	8000			6810		
	003B004	6750			5620		
	003B005	5960			8080		
	003B006	5390			9840		
	003B007	7015			NT		
	003B008	4920			5520		
	003B009	3750			6270		
	003B010	7220			6760		
Antimony (Sb)	003B004	0.34	3.10	2.89	ND	7.11	NA
	003B009	ND			0.39		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Inorganics (mg/kg)							
Arsenic (As)	003B001	1.60	0.43	17.20	2.60	536.02	15.50
	003B002	3.40			1.50		
	003B003	3.60			4.30		
	003B004	2.60			2.20		
	003B005	1.50			4.40		
	003B006	1.20			3		
	003B007	1.50			NT		
	003B008	1.60			1.80		
	003B009	2			2.90		
	003B010	3.30			2.20		
Barium (Ba)	003B001	34.80	550	109	20.30	631.79	64.50
	003B002	44.60			24.70		
	003B003	52			14.50		
	003B004	40.10			39.70		
	003B005	65			26.80		
	003B006	45.10			33.30		
	003B007	13.10			NT		
	003B008	37.50			22.30		
	003B009	27.90			40.20		
	003B010	38.30			36.80		
Beryllium (Be)	003B002	0.55	16	1.20	0.28	14.01	1.63
	003B003	0.67			0.29		
	003B004	0.56			0.53		
	003B005	0.58			0.37		
	003B006	0.51			0.50		
	003B008	0.49			0.37		
	003B009	0.35			0.64		
	003B010	0.52			0.43		
Cadmium (Cd)	003B001	ND	7.80	1.07	0.15	22.56	0.48
	003B002	0.22			ND		
	003B003	0.38			0.12		
	003B008	0.25			ND		
	003B009	ND			0.22		
	003B010	0.06			0.14		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Inorganics (mg/kg)							
Calcium (Ca)	003B001	3770	NA	NA	1290	NA	NA
	003B002	12400			813		
	003B003	34000			5180		
	003B004	6840			8040		
	003B005	1360			1270		
	003B006	1380			1420		
	003B007	567			NT		
	003B008	22600			7010		
	003B009	2830			23200		
	003B010	3280			929		
Chromium (Cr)	003B001	4.40	23	42.80	16.40	5561.99	43.40
	003B002	12			6.30		
	003B003	12.90			28		
	003B004	9.70			6.60		
	003B005	4.90			23.50		
	003B006	4.70			17.30		
	003B007	6.60			NT		
	003B008	5.60			9		
	003B009	4.70			14.20		
	003B010	12			9		
Cobalt (Co)	003B001	2	470	6.60	0.89	655.98	8.14
	003B002	2.60			1.60		
	003B003	2.10			0.90		
	003B004	2.40			2.30		
	003B005	2.50			0.90		
	003B006	2			1.90		
	003B007	9.20			NT		
	003B008	2.40			1.20		
	003B009	1.70			2.50		
	003B010	2.40			2.20		
Copper (Cu)	003B001	2.30	310	260	0.51	27410.37	32.60
	003B002	11.90			0.83		
	003B003	28.70			ND		
	003B009	ND			41.50		
	003B010	10.70			ND		
Cyanide (CN)	003B003	0.28	160	0.38	ND	13.30	0.22

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Inorganics (mg/kg)							
Iron (Fe)	003B001	4670	2300	29200	12700	708024.31	35800
	003B002	6860			5750		
	003B003	4210			20000		
	003B004	6170			4700		
	003B005	3510			16200		
	003B006	3210			12200		
	003B007	2950			NT		
	003B008	3320			8520		
	003B009	4100			5330		
	003B010	6660			6910		
Lead (Pb)	003B001	3	400	181	4.1	522.29	66.30
	003B002	114			4.1		
	003B003	50.60			5.5		
	003B004	16			8.2		
	003B005	5.40			6.4		
	003B006	4.90			7.0		
	003B007	5.40			NT		
	003B008	8.20			3.7		
	003B009	12.10			36.9		
	003B010	41.70			6.3		
Magnesium (Mg)	003B001	278	NA	NA	367	NA	NA
	003B002	630			289		
	003B003	1290			575		
	003B004	519			447		
	003B005	359			461		
	003B006	338			670		
	003B007	209			NT		
	003B008	1060			498		
	003B009	280			1260		
	003B010	602			420		
Manganese (Mn)	003B001	61.80	1100	325	27.3	161337.64	291
	003B002	193			39.1		
	003B003	183			26.0		
	003B004	194			196.0		
	003B005	341			29.8		
	003B006	207			62.1		
	003B007	17.65			NT		
	003B008	210			50.9		
	003B009	118			164.0		
	003B010	160			114.0		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Inorganics (mg/kg)							
Mercury (Hg)	003B001	0.27	2.30	1.03	ND	24.10	0.31
	003B002	0.06			ND		
	003B003	0.11			ND		
	003B009	ND			0.04		
	003B010	0.04			ND		
Nickel (Ni)	003B001	2.20	160	20.60	1.3	2366.00	18.30
	003B002	7			2.3		
	003B003	6.30			1.3		
	003B007	3.20			ND		
Potassium (K)	003B001	ND	NA	NA	245	NA	NA
	003B002	224			169		
	003B003	302			259		
	003B005	ND			347		
	003B006	ND			406		
	003B009	ND			258		
	003B010	278			ND		
Selenium (Se)	003B006	0.36	39	1.22	ND	219.39	1.26
	003B007	0.55			ND		
	003B009	ND			0.43		
	003B010	0.43			ND		
Sodium (Na)	003B001	167	NA	NA	154	NA	NA
	003B002	226			171		
	003B003	185			119		
Vanadium (V)	003B001	7.70	55	60.90	21.0	5928.27	72.50
	003B002	13.10			9.4		
	003B003	15.60			32.0		
	003B004	11.90			7.7		
	003B005	6			29.2		
	003B006	5.40			20.3		
	003B007	8.70			NT		
	003B008	6.70			14.3		
	003B009	7.30			17.2		
	003B010	15.80			11.3		
Zinc (Zn)	003B001	10.30	2300	519	59.8	103103.73	145
	003B002	47.10			14.4		
	003B003	64.30			9.2		
	003B007	33.60			ND		
	003B009	ND			126		
	003B010	52.90			ND		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
SWMU 24							
Volatile Organic Compounds (µg/kg)							
1,4-Dichlorobenzene	024B004	ND	27000	NA	34	762.99	NA
Semivolatile Organic Compounds (µg/kg)							
BEQs	024B001	176.97	87	453	0	NA	184
	024B002	128.41			0		
	024B003	189.10			0		
	024B004	141.48			172.39		
	024B005	0			0		
	024B006	887.68			0		
	024B007	292.23			0		
	024B009	94.40			137.21		
	024B010	142			0		
Benzo(a)anthracene	024B001	20	870	NA	3800	693.62	NA
	024B002	31			ND		
	024B003	69			ND		
	024B004	71			75		
	024B006	960			ND		
	024B007	100			ND		
	024B009	50			90		
	024B010	36			ND		
Benzo(a)pyrene	024B002	35	87	NA	ND	2962.31	NA
	024B003	87			ND		
	024B004	110			140		
	024B006	680			ND		
	024B007	190			ND		
	024B009	63			87		
	024B010	41			ND		
Benzo(h)fluoranthene	024B002	39	870	NA	ND	2143.29	NA
	024B003	85			ND		
	024B004	100			95		
	024B006	470			ND		
	024B007	260			ND		
	024B009	51			82		
	024B010	35			ND		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Semivolatile Organic Compounds ($\mu\text{g/kg}$)							
Benzo(k)fluoranthene	024B002	28	8700	NA	ND	21432.93	NA
	024B003	77			ND		
	024B004	94			75		
	024B006	750			ND		
	024B007	270			ND		
	024B009	58			68		
	024B010	30			ND		
Chrysene	024B002	40	87000	NA	ND	69361.60	NA
	024B003	70			ND		
	024B004	110			86		
	024B006	970			ND		
	024B007	200			ND		
	024B009	60			83		
	024B010	40			ND		
Dibenz(a,h)anthracene	024B004	29	87	NA	30	662.13	NA
	024B006	190			ND		
	024B009	30			48		
Indeno(1,2,3-cd)pyrene	024B002	21	870	NA	ND	6046.27	NA
	024B003	55			ND		
	024B004	76			68		
	024B006	330			ND		
	024B007	110			ND		
	024B009	38			48		
	024B010	29			ND		
2-Methylnaphthalene	024B004	ND	160000	NA	57	13209.67	NA
	024B005	340			8900		
	024B006	110			38500		
	024B007	ND			11000		
Acenaphthene	024B006	290	470000	NA	ND	228747.04	NA
Acenaphthylene	024B004	21	160000	NA	38	33715.44	NA
Anthracene	024B005	ND	2300000	NA	120	4724640.14	NA
	024B006	399.50			265		
Benzo(g,h,i)perylene	024B002	22	160000	NA	ND	41339296.88	NA
	024B003	64			ND		
	024B004	87			150		
	024B006	310			ND		
	024B007	120			ND		
	024B009	56			78		
	024B010	28			ND		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Semivolatile Organic Compounds (µg/kg)							
Benzoic acid	024B001	29	31000000	NA	ND	177050.51	NA
	024B002	29			42		
	024B003	50			67		
	024B004	40			74		
	024B009	50			80		
	024B010	36			51		
bis(2-Ethylhexyl)phthalate (BEHP)	024B006	200	46000	NA	ND	1315519.04	NA
Dibenzofuran	024B004	ND	31000	NA	27	4906.84	NA
	024B005	ND			460		
	024B006	325			1250		
	024B007	ND			380		
Dimethyl phthalate	024B009	440	78000000	NA	ND	621525.82	NA
Di-n-butylphthalate	024B001	20	780000	NA	ND	1825578.49	NA
	024B004	29			36		
	024B009	32			50		
	024B010	23			ND		
Fluoranthene	024B001	36	310000	NA	22	2332217.77	NA
	024B002	52			ND		
	024B003	110			ND		
	024B004	160			78		
	024B006	2500			ND		
	024B009	88			150		
	024B010	57			ND		
Fluorene	024B006	660	310000	NA	2200	302323.09	NA
	024B007	ND			510		
Isophorone	024B005	ND	670000	NA	370	166.61	NA
	024B006	ND			1900		
	024B007	ND			700		
N-Nitrosodiphenylamine	024B005	ND	130000	NA	890	338.34	NA
	024B006	450			3900		
Naphthalene	024B006	130	160000	NA	9200	22060.67	NA
	024B007	ND			4200		
Nitrobenzene	024B006	ND	3900	NA	420	37.98	NA

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Semivolatile Organic Compounds (µg/kg)							
Phenanthrene	024B002	26	230000	NA	ND	480449.19	NA
	024B003	56			ND		
	024B004	130			ND		
	024B005	ND			2000		
	024B006	2050			5050		
	024B007	ND			890		
	024B009	38			33		
	024B010	21			ND		
Pyrene	024B001	27	230000	NA	ND	1678349.00	NA
	024B002	46			ND		
	024B003	85			ND		
	024B004	130			79		
	024B005	ND			90		
	024B006	1800			230		
	024B007	120			110		
	024B009	74			130		
	024B010	43			ND		
Inorganics (mg/kg)							
Aluminum (Al)	024B005	7030	7800	18700	7600	1740950	23600
	024B006	8665			5675		
	024B007	5650			4650		
Antimony (Sb)	024B005	0.46	3.10	2.89	0.53	7.11	NA
	024B006	0.48			0.25		
	024B007	0.37			ND		
Arsenic (As)	024B005	2.50	0.43	17.20	8.10	536.02	15.50
	024B006	5.50			1.55		
	024B007	8.10			2.80		
Barium (Ba)	024B005	31.20	550	109	16.60	631.79	64.50
	024B006	15.90			20.55		
	024B007	19.90			8.50		
Calcium (Ca)	024B005	1960	NA	NA	481	NA	NA
	024B006	2760			184		
	024B007	16600			253		
Chromium (Cr)	024B005	9.60	23	42.80	22.60	5561.99	43.40
	024B006	27.80			7.75		
	024B007	15.40			10.80		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Inorganics (mg/kg)							
Cobalt (Co)	024B005	2.20	470	6.60	1.40	655.98	8.14
	024B006	1.55			1.01		
	024B007	1.60			0.76		
Copper (Cu)	024B005	3	310	260	0.86	27410.37	32.60
	024B006	1.15			0.75		
	024B007	10.40			0.39		
Iron (Fe)	024B005	4920	2300	29200	19100	708024.31	35800
	024B006	20750			6435		
	024B007	5880			9870		
Lead (Pb)	024B005	110	400	181	19100	522.29	66.30
	024B006	49.80			6435		
	024B007	62.10			9870		
Magnesium (Mg)	024B005	418	NA	NA	634	NA	NA
	024B006	503			389		
	024B007	898			262		
Manganese (Mn)	024B005	23.20	1100	325	54.5	161337.64	291
	024B006	36.55			25.65		
	024B007	74.80			16.9		
Mercury (Hg)	024B005	ND	2.30	1.03	0.04	24.10	0.31
	024B006	0.04			ND		
	024B007	0.06			0.06		
Nickel (Ni)	024B005	3.40	160	20.60	2.2	2366.00	18.30
	024B006	2.75			1.7		
	024B007	5.40			1.4		
Potassium (K)	024B005	206	NA	NA	365	NA	NA
	024B006	272			214.50		
	024B007	302			102		
Selenium (Se)	024B005	0.45	39	1.22	2.20	219.39	1.26
	024B006	1.60			0.69		
	024B007	0.72			1.10		
Sodium (Na)	024B005	90.10	NA	NA	99.40	NA	NA
	024B006	109			72.85		
	024B007	169			ND		
Vanadium (V)	024B005	13.80	55	60.90	43.9	5928.27	72.50
	024B006	37.10			12.05		
	024B007	16.60			18.2		

Analytes Detected in Surface and Subsurface Soil

Parameters	Sample Location	Surface Concentration	Residential RBC	Surface Background	Subsurface Concentration	Soil to Groundwater SSL (Site Specific)	Subsurface Background
Inorganics (mg/kg)							
Zinc (Zn)	024B005	38.50	2300	519	8.7	103103.73	145
	024B006	17.60			5.75		
	024B007	47.20			4.7		

Notes:

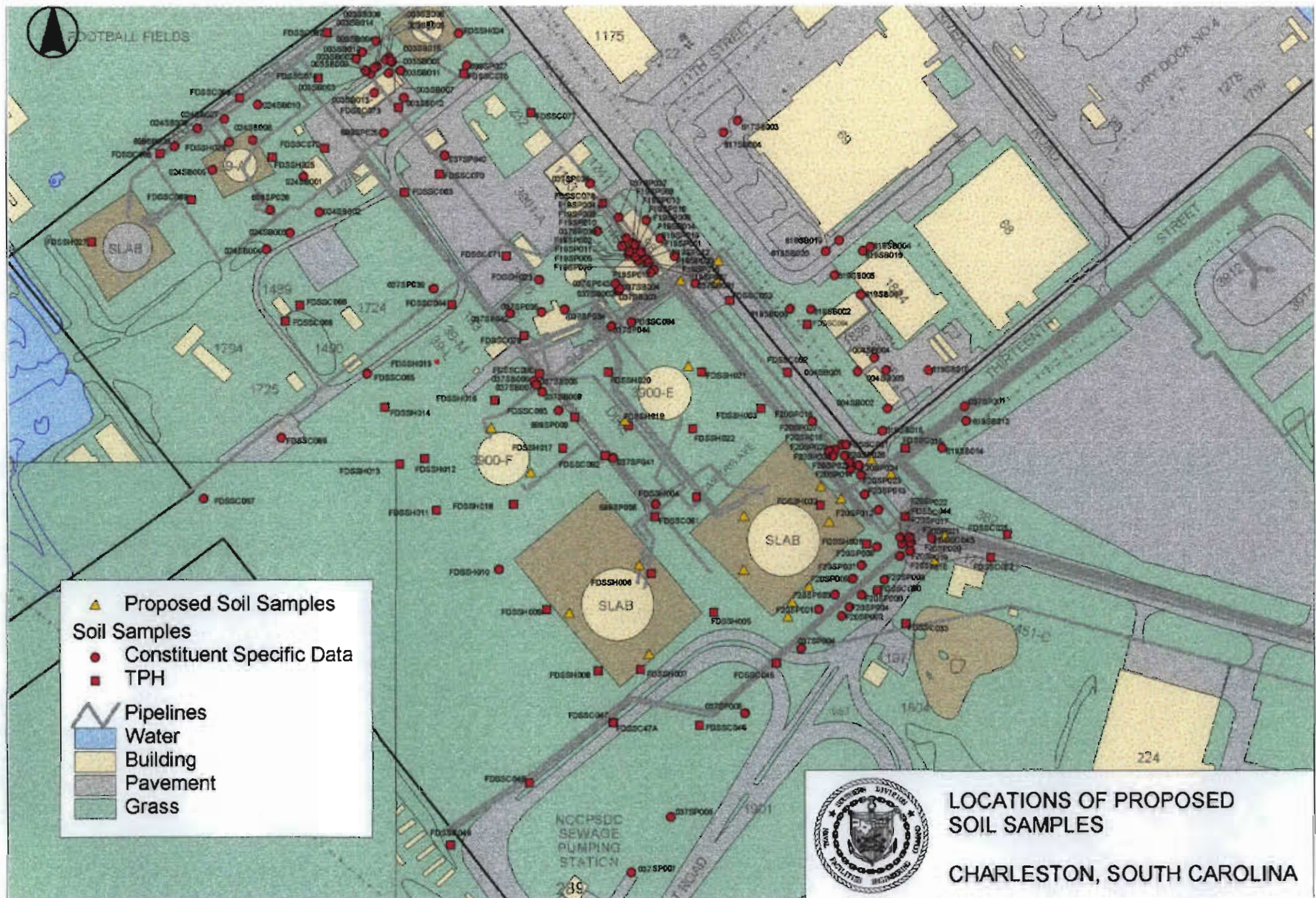
Table 10.3.11
SWMU 003
Analytes Detected in Shallow Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Inorganics (mg/kg)							
Aluminum (Al)	003001	9930	202	590	3700	50	224
	003002	2465	109	27			
	003003	15200	741	966			
Arsenic (As)	003001	9.6	ND	ND			
	003002	3.1	ND	ND			
	003003	9.7	ND	ND			
Barium (Ba)	003001	76.9	29.1	24.3	260	2000	94.3
	003002	34.4	17	15.9			
	003003	77.1	20.2	19.8			
Beryllium (Be)	003002	ND	0.35	ND			
	003003	1.1	ND	ND			
Calcium (Ca)	003001	65100	47800	46500	NL	NL	NL
	003002	5500	3275	21900			
	003003	41100	27800	32400			
Chromium (Cr)	003001	20.4	ND	1.2	18	100	2.05
	003002	5.4	ND	ND			
	003003	6.6	1.1	ND			
Cobalt (Co)	003001	5.9	ND	ND			
	003002	5.4	2.7	ND			
	003003	6.6	1.1	ND			
Iron (Fe)	003001	15100	371	448	1100	300	NL
	003002	3460	63.6	47.8			
	003003	22800	606	973			
Magnesium (Mg)	003001	9370	8680	3370	NL	NL	NL
	003002	1700	939	1855			
	003003	7640	3770	6710			
Manganese (Mn)	003001	199	80.9	8.7	84	50	2010
	003002	189	102.6	33.8			
	003003	544	46.6	24.8			
Mercury (Hg)	003001	ND	ND	0.28			

Table 10.3.11
SWMU 003
Analytes Detected in Shallow Groundwater

Name	Location	1 st Quarter Conc.	2 nd Quarter Conc.	3 rd Quarter Conc.	Tap Water RBC* (µg/L)	MCL/SMCL* (µg/L)	Shallow Background
Inorganics (mg/kg)							
Nickel (Ni)	003001	10	ND	ND			
	003002	4.9	1.0	64.5			
	003003	10.7	ND	2.2			
Potassium (K)	003001	ND	757	1590	NL	NL	NL
	003002	672	ND	ND			
	003003	3300	1670	1950			
Selenium (Se)	003003	6	ND	ND			
Sodium (Na)	003001	18400	19200	9100	NL	NL	NL
	003002	9605	8590	18300			
	003003	38200	17400	36300			
Thallium (Tl)	003001	3.5	ND	ND	0.29	2	5.58
	003002	2.9	ND	ND			
	003003	2.8	ND	ND			
Vanadium (V)	003001	31.4	1.3	1.2	26	NL	1.58
	003002	ND	7.1	ND			
	003003	46.7	2	2.2			
Zinc (Zn)	003002	ND	6.6	ND			
	003003	ND	59.8	22.2			

Notes:





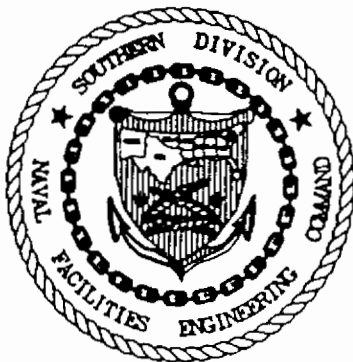
**DRAFT FINAL
HOBSON FUEL FARM
SITE ASSESSMENT REPORT
CNC CHARLESTON
NORTH CHARLESTON, SOUTH CAROLINA**

Volume I of I

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Release of this document requires prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina.

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1.0 INTRODUCTION

As part of the U.S. Navy Comprehensive Long-term Environmental Action Navy (CLEAN) Program, the following *Hobson Fuel Farm Site Assessment Report* has been prepared for the Hobson Fuel Farm (HFF) at Charleston Naval Complex (CNC). This report addresses the HFF area of the CNC Fuel Distribution System (FDS). The HFF was originally identified in the Final RCRA Facility Assessment report (EnSafe/Allen & Hoshall, June 6, 1995) as being located within AOC 626. AOC 626 includes the former Naval Supply Center Fuel Farm, while the HFF investigation focuses on the area surrounding tanks 3900E, 3900F, 3916, and 3917. This assessment included a review and summation of previous investigative findings and additional soil and groundwater samples to characterize the HFF prior to transfer and redevelopment.

The HFF and its surrounding area have been investigated for petroleum releases multiple time since 1986, to include:

- An initial site characterization in 1986 of the area surrounding former tanks 3900G and 3900H by ESE, Inc. (ESE).
- A contamination assessment in 1990 and remedial action in 1992 of the area surrounding former tanks 3900G and 3900H by KEMRON, Inc. (KEMRON).
- A soil total petroleum hydrocarbon (TPH) study in 1992 along a fuel supply line that parallels the south side of Hobson Avenue north of the HFF area by S&ME, Inc. (S&ME).
- A Site Characterization and Analysis Penetrometer System (SCAPS) within the AOC 626 in July of 1995 by the Naval Facilities Engineering Service Center (NFESC).
- An Interim Measure (IM) and closure of Facility 148 in August of 1996 by the Supervisor of Shipbuilding, Conversion and Repair, USN, Portsmouth, VA, Environmental Detachment Charleston SC (SPORTENVDETHASN).
- An IM of a former 18-inch diameter fuel supply pipeline beneath Viaduct Road in December, 1996 by SPORTENVDETHASN.

- An investigation of the CNC FDS (Areas 1 - 20) in 1996 - 1997, and 1999 - 2000 by EnSafe to identify system-wide problems associated with petroleum releases from previous operations of the FDS. Areas 1 through 20 were addressed in the *FDS Contamination Assessment Report (CAR)* (EnSafe, Inc. [EnSafe] September 10, 1998). The FDS CAR discusses the objectives, scope, methodology, history and physical setting for the FDS, which are directly applicable to this HFF site assessment.

Figure 1-1 on page 21 presents the location of the HFF relative to the CNC. Figure 1-2 on page 22 shows the locations of the previous investigations. A summary discussion of the previous investigations is provided in Section 2.0.

The primary purpose of this assessment was to perform a focused review of previous investigative findings to determine whether or not the HFF had been characterized adequately to satisfy site closeout requirements under either the South Carolina Department of Health and Environmental Control (SCDHEC) Underground Storage Tank (UST) Program and/or the RFI. In several areas where the characterization was not complete a limited field investigation was performed from September-November of 2000. Since the majority of the site was investigated following UST guidelines, particular interest was placed on determining whether or not RCRA constituents may have been overlooked in areas which may have handled materials other than virgin petroleum products.

The secondary purpose of the assessment was to provide the information necessary for the CNC Project Team to provide feedback to the CNC Redevelopment Authority (RDA) regarding potential environmental concerns related to the siting of an approximately 250,000 ft² warehouse that has been proposed for construction in the HFF area. The HFF area is large enough that some flexibility apparently exists in determining a location suitable in size to accommodate the footprint of the proposed warehouse foundation but determining that location could be highly dependent on the outcome of the HFF assessment results.

Areas 1 through 20 were addressed in the FDS CAR (EnSafe September 10, 1998). During September-November of 2000, field investigations were conducted at the HFF to identify impacts to soil and groundwater, and to define the extent of free product contamination, if any, within the site area. The limited scope of the HFF investigation was to comprehensively review all previous investigations, address outstanding issues, and fill data gaps to facilitate transfer of the property.

The FDS CAR (EnSafe, September 10, 1998) discusses the objectives, scope, methodology, history and physical setting for the FDS, which are applicable to this HFF site assessment. This report summarizes and compares previous investigation results, describes the specific field investigation conducted, presents and discusses the analytical data collected, and makes appropriate recommendations for the HFF.

1.1 Site History

A historical review of figures and maps was conducted to gain a detailed perspective of the HFF area over time. Prior to the mid-1930s, the portion of the CNC where the HFF is located consisted of marshland along the Cooper River. This marshland was filled over time, and the base was expanded to the southeast over the filled area. The HFF was built over a portion of this filled area between 1936 and 1944. The HFF area originally included four 55,000 barrel (bbl) concrete tanks with brick facing. In 1974, two of these tanks (the former 3900G and 3900H) were switched from storing Navy Special Fuel Oil to the less viscous Navy Distillate. The tanks began to leak, and were taken out of service in 1975. These tanks were demolished in late 1991, and the current steel tanks (3916 and 3917) were constructed in early 1992. The site area was used as a fuel farm until the CNC was closed in the early 1990s.

1.2 Site Geology and Hydrogeology

The FDS CAR (EnSafe, September 10, 1998) discuss the geology and hydrogeology of the FDS, including the HFF area. The shallow groundwater flow is discussed later, relative to the analytical results.

2.0 PREVIOUS INVESTIGATIONS

2.1 ESE Assessment

Environmental assessment of the HFF area began in 1986 with the initial site characterization performed by ESE, Inc. ESE sampled soil and shallow groundwater at the site and nearby surface water and sediment. ESE found contamination to a depth of eight feet below ground surface (bgs) over a 48,000 square-foot area where the former tanks 3900G and 3900H stood. Soil and groundwater samples were analyzed for TPH, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). TPH concentrations in soil ranged from 146 to 7,280 milligrams per kilogram (mg/kg); while groundwater TPH detections ranged from 341 to 130,000 micrograms per liter ($\mu\text{g/L}$). No VOCs were detected in soil or groundwater. Subsequent groundwater sampling by ESE identified PAHs, including some Risk-based Screening Level (RBSL) constituents (KEMRON, 1990).

2.2 KEMRON Assessment/Remedial Activities

In 1990, KEMRON conducted further study of the HFF area to more closely determine the horizontal and vertical distribution of contamination in the vicinity of the former 3900G and 3900H. Soil analyses included TPH and VOCs, while groundwater samples were analyzed for TPH, VOCs and PAHs. The KEMRON study detected TPH and PAHs, and determined that the horizontal extent of contamination around 3900G and 3900H was smaller than the area originally identified by ESE. The vertical extent was also further refined. KEMRON identified impacted soil from two to ten feet bgs. Resampling of site monitoring wells by KEMRON revealed much lower TPH and PAH concentrations than was originally reported by ESE, indicating a lesser impact to groundwater than was previously observed. No VOCs were detected in this follow-on sampling.

From late 1991 to early 1992, after the demolition of tanks 3900G and 3900H and prior to the construction of newer tanks 3916 and 3917, a partially successful attempt at land farming was conducted by KEMRON. This effort was hampered by severe seasonal rainfall and was suspended when construction began on the new tanks (KEMRON, February 1992). Although limited soil

removals were reportedly performed in the areas of these tanks, this was not documented in either of the KEMRON documents reviewed (KEMRON, 1990; KEMRON, 1992).

After the ESE and KEMRON investigations were conducted, several investigations were performed on areas adjacent to the HFF area, or in areas subject to IM action. These subsequent investigations focused on areas of specific petroleum related contamination associated with the FDS, or to confirm the removal of contaminated media associated with IMs.

2.3 S&ME TPH Survey

In May of 1992, S&ME, Inc. was retained by the Navy to conduct a soil TPH survey along a fuel supply line that parallels the south side of Hobson Avenue north of the HFF area. The purpose of the investigation was to determine if petroleum related contamination exists along the pipeline right-of-way. Soil samples for TPH analysis were collected at the soil-water interface, at approximately six-feet ft bgs. Two of four samples collected along the northeast and northwest sides of Building 98 revealed subsurface soil TPH concentrations of 690 and 1,000 mg/kg, respectively (TPH was not detected in the other two samples). S&ME's investigation report concluded that soil and groundwater were likely contaminated along this pipeline, and that appropriate abatement procedures should be followed during excavation and dewatering activities which were to accompany forthcoming repairs (S&ME, May 28, 1992).

2.4 NFESC SCAPS Study

In July of 1995, NFESC performed a site characterization within the AOC 626 (the Naval Supply Center Fuel Farm, including the HFF and surrounding area investigated under the FDS) area using a SCAPS. The objective of the NFESC's investigation was to define the extent of PAH contamination in the area outside the Fuel Farm proper. Confirmatory soil samples were also collected from depths coinciding with the suspected contamination areas. The SCAPS investigation, in conjunction with the confirmatory soil sampling, failed to reveal extensive petroleum contamination in soil (NFESC, April 1996).

2.5 Facility 148 IM

In August of 1996, SPORTENVDETHASN performed an IM assessment and closure at Facility 148. The tank had been emptied and cleaned prior to the IM, and contained no residual fuel. Free product and petroleum contaminated soil were found throughout the excavation and demolition of Facility 148. Confirmatory samples were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) constituents, and PAHs. The area most impacted was associated with the piping to Building 98. The excavation was open until July 1997 when the tank pit was backfilled with clean soil (SPORTENVDETHASN, 1997). The FDS CAR (EnSafe, September 10, 1998), identified this area as FDS Area 19, requiring additional assessment due to the petroleum contamination observed during the Facility 148 IM activities.

2.6 AOC 626 IM

In December of 1996, the SPORTENVDETHASN performed an IM at the southwest intersection of Hobson Avenue and Viaduct Road. The objective of this IM was to remove a portion of the 18-inch diameter abandoned fuel pipeline buried beneath the site (AOC 626), remove petroleum saturated soil found during the excavation, and install a free product recovery system, if required. Initial excavations during this removal action revealed heavily stained soil to five feet bgs, with free product leaching from the sides of the open excavation. A total of 229 linear feet of the 18-inch diameter fuel pipeline were removed from where the pipeline traversed beneath Viaduct Road. Approximately 450 cubic yards of petroleum contaminated soil were also removed during the IM. Confirmatory samples were collected from the bottom of the excavation pit and analyzed for TPH, BTEX, PAHs, and metals. A 200-foot, horizontal, perforated, polyvinyl chloride (PVC) free product recovery system was installed, along with PVC vertical standpipes for product recovery. Approximately 40,000 gallons of water mixed with oil was recovered from the site by this system (SPORTENVDETHASN, 1997). The FDS CAR (EnSafe, September 10, 1998), identified this area as FDS Area 20, requiring additional assessment due to the residual petroleum contamination observed during the pipeline IM activities.

2.7 Zone L Subzone G Investigation

In 1997, EnSafe commenced the investigation of Zone L, to address possible releases from the CNC railroads, and storm water and sanitary sewer systems. Zone L, Subzone G included some sewer lines which traversed the HFF area. Twenty direct push technology (DPT) soil and 30 DPT groundwater samples were collected for VOCs, metals, and cyanide. Fourteen hand-auger soil borings advanced during the investigation and two monitoring wells installed at Subzone G were analyzed for VOCs, semivolatile organic compounds (SVOCs), metals, cyanide, chlorinated pesticides, and polychlorinated biphenyls (PCBs).

2.8 FDS Investigation

In 1996, EnSafe commenced investigation of the CNC FDS. The FDS investigations, performed subsequent to the ESE and KEMRON studies, focused on areas of petroleum related contamination associated with specific releases from the FDS and areas of likely release.

The FDS investigation performed by EnSafe attempted to identify system-wide problems associated with petroleum releases from previous operation of the CNC FDS. The FDS investigation encompassed all buried and above ground fuel pipelines within the CNC area, and storage tanks associated with this piping. The investigation covered areas both inside, adjacent to, and outside the HFF area. The phased investigation commenced with a DPT (Phase I) TPH soil survey along the various fuel pipelines throughout CNC to identify areas of aggregate petroleum contamination. These biased DPT screening samples were collected from areas most likely to have been impacted (i.e., surface where the pipelines and valves were at the surface and subsurface adjacent to buried pipelines). Areas with TPH results greater than 50 mg/kg diesel range organics (DRO) or 50 μ g/kg gasoline range organics (GRO) were targeted for Phase II, constituent specific soil and groundwater sampling and designated as Areas 1-18. During Phase II, discrete samples were collected from these areas and analyzed for standard analytical parameters (VOCs, SVOCs, pesticides and PCBs, metals, and cyanide).

Areas 19 and 20, adjacent to the HFF, were later added to this group of sites. 1
DPT soil and groundwater sampling, and well installation and sampling, was performed at 2
Areas 19 and 20 in 1999. 3

The FDS CAR (EnSafe, September 10, 1998) found that Areas 8, 12, 13, 14, and 15 exhibited 4
limited soil and groundwater contamination associated with the FDS. Intrinsic remediation was 5
recommended for soil at Areas 8, 12, 13, and 14, along with monitoring of groundwater. 6
No further action was recommended for soil or groundwater at Area 11 and 15. Areas 19 and 20 7
have not yet been submitted to SCDHEC, because the additional results are pending. 8

Figures 2-1 and 2-2 on pages 23 and 24 present the analytical suites by soil and groundwater, 9
respectively, for all EnSafe samples collected in and adjacent to the HFF area. Table 2.1 on 10
page 32 presents the Phase I TPH analytical results of the screening samples collected during the 11
FDS investigation in and adjacent to the HFF. 12

Figures 2-3 and 2-4 on pages 25 and 26 present the Phase I TPH data for surface and subsurface 13
soil, respectively. Phase II soil samples were collected from areas of elevated TPH. 14
Phase II soil samples were analyzed for constituent specific analyses. Table 2.2 on page 34 15
presents the Phase II samples that were collected within and adjacent to the HFF area during the 16
FDS investigation. Of the 18 areas found to require further evaluation under Phase II, 17
Areas 8, 11, 12, 13, 14, and 15 are adjacent to the HFF area. The Phase II soil analytical results 18
for these areas are presented in Table 2.3 on page 35. Areas of potential groundwater 19
contamination were identified for investigation, based on the FDS Phase I/II soil investigation. 20
Monitoring wells were installed so that groundwater samples could be collected from the saturated 21
backfill material surrounding the pipeline or at a comparable depth. Table 2.4 on page 44 details 22
the monitoring wells that were sampled in conjunction with the FDS areas adjacent to the HFF. 23
The analytical data summary for these samples are presented in Table 2.5 on page 46. 24

2.8.1 Area 8

Area 8, associated with FDS Phase I sample FDSSC04701, had TPH-GRO results of 19,000 $\mu\text{g}/\text{kg}$, prompting subsequent Phase II soil and groundwater sampling (Table 2.1). Phase II sample FDSSC47A exhibited total naphthalenes above the respective RBSL. All VOCs and metals at this boring were below appropriate soil screening standards (Table 2.3).

No VOCs were detected in samples from the Area 8 monitoring wells. The groundwater RBSL for total PAHs was exceeded during the first, but not the second, sampling event at Area 8. No RBSLs for groundwater metals were exceeded at Area 8. No groundwater RBSL constituents were exceeded in downgradient well FDS08D, which was installed later at the site (Table 2.5).

Subsequent to the installation and sampling of FDS08D, it was recommended that two quarterly monitoring events of the Area 8 wells be conducted. If concentrations remain below groundwater RBSLs during this monitoring program, it was recommended that these results be used to support a no further action decision for soil and groundwater at Area 8 (EnSafe, June 30, 1999).

2.8.2 Area 11

The Phase I TPH-GRO sample results for soil boring FDSSC05101 was 42.75 $\mu\text{g}/\text{kg}$, prompting subsequent Phase II soil and groundwater sampling within Area 11 (Table 2.1). The primary sample result was 77.6 $\mu\text{g}/\text{kg}$ TPH-GRO. This value is an average of the primary and duplicate sample collected at this location. No VOCs were detected in subsurface soil at Area 11. All RBSL SVOCs and metals detected at Area 11 were below their respective soil screening standards (Table 2.3).

No RBSL VOCs or metals were exceeded in groundwater samples from the Area 11 monitoring wells. No RBSL SVOCs were detected in groundwater at Area 11 (Table 2.5).

Because no groundwater RBSLs were exceeded in either of two sampling events at Area 11, the FDS CAR (EnSafe, September 10, 1998) recommended and SCDHEC concurred no further action for this area.

2.8.3 Areas 12, 13, and 14

The Phase I TPH-GRO sample results for soil borings FDSSC06501, FDSSC6601, and FDSSC6701 were 147 $\mu\text{g/kg}$, 67 $\mu\text{g/kg}$, and 106 $\mu\text{g/kg}$, respectively, prompting subsequent Phase II soil and groundwater sampling within Areas 12, 13, and 14 (Table 2.1). RBSL VOCs and metals were below their respective screening levels at Areas 12, 13, and 14. The RBSL for total naphthalenes was exceeded at FDCSC06601 and FDSSC06701 (Table 2.3).

No RBSL VOCs were detected in groundwater samples from Areas 12, 13, and 14. RBSL SVOCs were below their respective screening levels at Area 12, 13, and 14. The RBSL arsenic (50 $\mu\text{g/L}$) was exceeded during the second sampling event at location FDS13A (210 $\mu\text{g/L}$). During the third sampling event at FDS13A, arsenic (18.3 $\mu\text{g/L}$) was below the RBSL.

To support the FDS CAR (EnSafe, September 10, 1998) recommendation of intrinsic remediation for the total naphthalenes detected in soil, the follow-on Letter Report for these areas (EnSafe, June 30, 1999) recommended limited monitoring of groundwater for these areas. This report recommended that groundwater at well FDS14B downgradient of FDSSC06701 and wells FDS13B and FDS13C downgradient of FDSSC06601 be sampled and analyzed for RBSL SVOCs two more times at three-month intervals to demonstrate that soil contaminants are not adversely impacting groundwater.

2.8.4 Area 15

The Phase I TPH-GRO sample results for surface-soil boring FDSSH02301 was 501 $\mu\text{g/kg}$, prompting subsequent Phase II soil and groundwater sampling within Area 15 (Table 2.1). RBSL VOCs and metals were below their respective screening levels in soil at Area 15.

Total naphthalenes were elevated at FDSSH02301. Based on these results, a 3- to 5-foot subsurface soil sample, FDSSH02302, was collected and analyzed to determine the vertical extent of naphthalenes at Area 15. No subsurface soil concentration from this sample exceeded its appropriate RBSL (Table 2.3).

No RBSL VOCs/metals were exceeded in groundwater samples from Area 15. No RBSL SVOCs were detected in Area 15 groundwater samples (Table 2.5).

Because of the absence of RBSL parameters detected in surface or subsurface soil and groundwater at Area 15, EnSafe recommended and SCDHEC concurred no further action for soil or groundwater at this area.

2.8.5 Other Areas

Though not assigned an area, Phase I boring FDSSC084 was given constituent specific analyses during Phase II due to observed conditions. No soil RBSL parameters were exceeded at this location (Table 2.3).

Areas 19 and 20 were added to the scope of the FDS investigation in 1998. During 1999 and 2000, field investigations were conducted at Areas 19 and 20 to identify potential impacts to soil and groundwater, and to define the extent of free product contamination, if any, at these sites. DPT soil and groundwater samples were collected at these sites and analyzed for RBSL VOC and SVOC parameters. Initial rounds of DPT sampling focused on areas of contamination identified by the previous site investigations or IM activities. Subsequent DPT sampling was performed to delineate the extent of contamination around RBSL exceedances. Table 2.6 on page 57 details the Areas 19 and 20 DPT soil and groundwater samples, and their analyses. Table 2.7 on page 61 summarizes the Areas 19 and 20 DPT analytical soil results. Table 2.8 on page 68 presents a summary of the DPT groundwater results

for Areas 19 and 20. Seven permanent shallow groundwater monitoring wells were installed at Areas 19, along with six wells at Area 20, to confirm the DPT results and facilitate future monitoring, if required, at these sites. Table 2.9 on page 74 presents a summary of the monitoring well analytical results at Areas 19 and 20.

2.8.5.1 Area 19

Area 19 DPT soil data revealed benzene, ethylbenzene, and naphthalenes detected above the appropriate groundwater protection RBSLs, with most exceedances detected near the source area (the former Facility 148) along the southwest side of Building 98.

DPT groundwater results for Area 19 revealed benzene, total PAHs, naphthalene, 2-methylnaphthalene, and chrysene concentrations above the appropriate groundwater RBSLs. These results revealed that groundwater adjacent to Building 98 has been impacted by petroleum constituents, primarily within the same area of impacted soil adjacent to the southwest side of Building 98.

Groundwater analytical data from the Area 19 monitoring wells exhibited no RBSL exceedances. The monitoring well results showed that the area of localized groundwater contamination defined during the DPT sampling was appropriately delineated at this site.

The FDS Car Addendum will recommend that Area 19 monitoring wells be sampled quarterly for a period of one year. The recommended analyses for these quarterly samples will be RBSL VOCs and SVOCs to ensure that constituents detected in soil and groundwater at Area 19 are not migrating off-site.

2.8.5.2 Area 20

Area 20 DPT soil analytical data revealed that benzene, naphthalene, and total naphthalenes were present above the appropriate groundwater protection RBSLs (Table 2.7). Most exceedances were detected adjacent to the footprint of the Viaduct Road pipeline IM and also northwest of the removal area along the fuel pipeline corridor which parallels Hobson Avenue.

DPT groundwater analytical results for Area 20 detected total PAHs, naphthalene, 2-methylnaphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene above the appropriate RBSLs (Table 2.8). These results revealed that naphthalene and total PAHs exceeded their RBSLs at sample locations northwest of the pipeline removal area along Hobson Avenue. Petroleum contaminated soil in this area is the likely source of the groundwater contamination at this locale.

Groundwater analytical data from the Area 20 monitoring wells exhibited no RBSL exceedances (Table 2.9). The monitoring well results showed that the area of localized groundwater contamination defined during the DPT sampling was appropriately delineated at this site.

The FDS Car Addendum will recommend that Area 20 monitoring wells be sampled quarterly for a period of one year. The recommended analyses for these quarterly samples will be RBSL VOCs and SVOCs to ensure that constituents detected in soil and groundwater at Area 20 are not migrating off-site.

3.0 HOBSON FUEL FARM INVESTIGATION

As mentioned in Section 1.0, the primary purpose of the HFF investigation was to perform a focused review of previous investigations to determine whether the HFF area had been adequately characterized to support site closeout requirements. Particular interest was placed on the possibility that RCRA constituents might have been overlooked, since the majority of the site was investigated using SCDHEC's petroleum program guidelines. The secondary purpose was to

provide adequate information to assist the Project Team in making a site disposition
recommendation to the RDA.

DPT soil (surface [0-1 ft bgs] and subsurface soil [3-5 ft bgs] intervals) and shallow groundwater
samples were collected to characterize the nature and extent of soil and groundwater contamination
at the site. The soil and groundwater samples were analyzed for VOC and SVOC parameters.
Table 3.1 on page 77 presents the soil and groundwater DPT samples collected and the analyses
performed at the HFF. Figure 3-1 on page 27 illustrates the HFF sample locations.

3.1 Data Gaps

The HFF soil and groundwater DPT sampling points were located to fill the following data gaps:

- No constituent specific soil samples were collected within the HFF area during the FDS
Phase II investigation. This was because FDS Phase I TPH sampling results from within
the HFF area were below the 50 $\mu\text{g}/\text{kg}$ threshold, and thus did not trigger Phase II
sampling.
- The need to adequately confirm the contaminated area delineated around tanks 3916 and
3917 by the ESE and KEMRON investigations.
- The need to completely delineate petroleum contamination in soil and groundwater within
the HFF and identify potential RCRA concerns prior to property transfer.

3.2 HFF Soil Sample Results

Ten DPT soil borings, plus four follow-on borings (data results pending as of this report),
were advanced at the HFF. No free product was observed. Surface and subsurface soil results
from these borings were compared to the appropriate RBSLs. Table 3.2 on page 79 presents a
summary of the analytical results of the DPT soil sampling. Figures 3-2 and 3-3 on
pages 28 and 29 provide data summaries of surface soil and subsurface soil results, respectively,
for all recently collected soil samples from investigations conducted within the HFF and
adjacent areas.

Two VOCs, acetone and methylene chloride, were detected in surface soil. Neither of these analytes is regulated by a RBSL concentration. In addition, none of these exceeds any other applicable screening value.

Four VOCs, acetone, chlorobenzene, ethylbenzene, and methylene chloride were detected in subsurface soil at the HFF. Of these, only ethylbenzene is a RBSL constituent, and the subsurface soil detection at location HFFSP002 ($2 \mu\text{g/kg}$) was below the groundwater protection RBSL of $1,260 \mu\text{g/kg}$.

Twenty-one SVOCs were detected in soil during the HFF investigation. Of these, total naphthalenes, naphthalene, 2-methylnaphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and dibenz(a,h)anthracene are regulated fuel constituents. Seven of these parameters exceeded the dermal protection RBSLs applicable to surface soil. These surface soil exceedances were limited to locations HFFSP004, HFFSP006 and HFFSP007. The subsurface concentrations of these compounds at these locations were all either non-detect or below the applicable RBSL. Fourteen other SVOCs were detected in surface soil. Of these, only benzo(a)pyrene and indeno(1,2,3-cd)pyrene exceeded the applicable RBCs of $87 \mu\text{g/kg}$ and $870 \mu\text{g/kg}$ respectively.

Significant subsurface soil impact was limited to location HFFSP008. Concentrations of RBSL parameters total naphthalenes and naphthalene exceeded the RBSL of $210 \mu\text{g/kg}$. No other subsurface constituents exceeded applicable screening values.

3.2.1 HFF Soil Analytical Summary

As previously discussed in this report, Figure 2-1 on page 23 illustrates the locations and analytical parameter suites for soil samples collected as part of the investigation of the FDS, Zone L RFI and the HFF. The area was initially screened for surface and subsurface TPH as part of the FDS investigation. The surface and subsurface TPH results are summarized in Figures 2-3 and 2-4 on pages 25 and 26 respectively.

TPH was detected, less than 100 $\mu\text{g/kg}$ at several surface soil sample locations. The highest 1
detection, FDSSH023 (501 $\mu\text{g/kg}$), was further investigated as Area 15 within the HFF. 2
Two others are located within the area of contaminated soil identified by KEMRON near former 3
tanks 3900G and 3900H, FDSSH001 (10 $\mu\text{g/kg}$) and FDSSH006 (9.0 $\mu\text{g/kg}$). 4
The other four locations FDSSH016 (32 $\mu\text{g/kg}$), FDSSH018 (10 $\mu\text{g/kg}$), FDSSH021 (10 $\mu\text{g/kg}$), 5
and FDSSH022 (10 $\mu\text{g/kg}$) are located near tanks 3900E and 3900F. 6

TPH was detected in subsurface locations FDSSC081 (9 $\mu\text{g/kg}$), FDSSC082 (8 $\mu\text{g/kg}$) and 7
FDSSC083 (8 $\mu\text{g/kg}$), which are associated with underground fuel pipelines, below the screening 8
value of 50 $\mu\text{g/kg}$. TPH detected in subsurface locations FDSSC047 (19,000 $\mu\text{g/kg}$), 9
FDSSC065 (147 $\mu\text{g/kg}$), FDSSC066 (67 $\mu\text{g/kg}$) and FDSSC067 (106 $\mu\text{g/kg}$) exceeded the 10
50 $\mu\text{g/kg}$ value. These detections resulted in further investigation as Areas 8, 12, 13 and 14 11
respectively. 12

Figure 3-2 on page 28 presents the results of a comparison of the constituent-specific analytical 13
results to the RBCA RBSLs and to Region III surface soil RBCs (THQ = 0.1). 14
Areas potentially problematic to redevelopment of the HFF area are HFFSP004, HFFSP005, 15
HFFSP006 and HFFSP007. The compounds of concern in these four locations are SVOCs, 16
commonly associated with petroleum contamination. These four locations are associated with 17
tanks 3900E and 3900F. Other potential problem locations are 037SP003, 037SP004 and 18
037SP041. These exceedances were driven by arsenic exceeding the RBC. All were below the 19
Zone G background concentration for arsenic of 17.2 $\mu\text{g/kg}$. 20

Figure 3-3 on page 29 presents the results of a comparison of the constituent-specific analytical 21
result to the RBCA groundwater protection RBSL and to site-specific SSLs (AOC 619/SWMU 4). 22
Potentially problematic areas are associated with: two points in Area 20, F20SP001 and 23

F20SP041; and HFFSP008. The total naphthalene concentration detected at HFFSP008 is most likely attributable to residual petroleum contamination. The extent is limited by surrounding sample points. The Area 20 points, F20SP041 and F20SP001 are expected to be outside of the footprint of the planned redevelopment project and will be addressed in the CAR for Area 20.

3.3 HFF Groundwater Sample Results

Seven DPT groundwater samples were collected at the HFF. Table 3.3 on page 82 presents a summary of the analytical results of the DPT groundwater sampling. Figure 3-4 on page 30 provides a data summary of for all recently collected groundwater samples from investigations conducted within the HFF and adjacent areas. DPT groundwater results for the HFF revealed detections of VOCs and SVOCs.

3.3.1 HFF Groundwater Analytical Summary

As previously discussed, Figure 2-2 on page 24 illustrates the locations and analytical parameter suites for groundwater samples collected as part of the investigation of the FDS, Zone L RFI and the HFF. Also shown on Figure 2-2 is the shallow groundwater potentiometric surface contours. Shallow groundwater flow is variable but is generally away from the HFF area. Figure 3-4 on page 30 presents the results fo a comparison of the constituent-specific analytical results to the RBCA groundwater RBCLs and Region III tapwater RBCs. Potentially problematic areas are associated with locations: HFFGP010, F20GP044, F20GP037 and FDS20D which are located near former tanks 3900G and 3900H. With the exception of F20GP044, these do not appear to be attributable to petroleum releases. Other potential problematic areas are associated with HFFGP006, HFFGP012, HFFGP013 and 037602. These locations are near tanks 3900E and 3900F. However, the constituents do not appear to be petroleum related.

The VOCs detected were 1,2-dichloroethene (total), and methylene chloride. The SVOCs detected were benzoic acid and bis(2-ethylhexyl)phthalate. None of these constituents are RBSL parameters. The concentration of 1,2-dichloroethene, 21 $\mu\text{g/L}$, exceeded the MCL of 5 $\mu\text{g/L}$ and the tapwater RBC of 5.5 $\mu\text{g/L}$. No other screening values were exceeded. None of the compounds detected in groundwater are considered to be fuel constituents.

4.0 CONCLUSIONS

This expedited evaluation of the HFF was performed to gain a comprehensive understanding of current soil and groundwater conditions to facilitate property transfer and subsequent development activities. As a result, the potentially problematic areas near the anticipated area of construction, tanks 3916 and 3917, were the primary focus of delineation sampling. Data gaps in soil still exist near tanks 3900E and 3900F. However, delineation in those areas was not included in EnSafe's scope of work for the HFF.

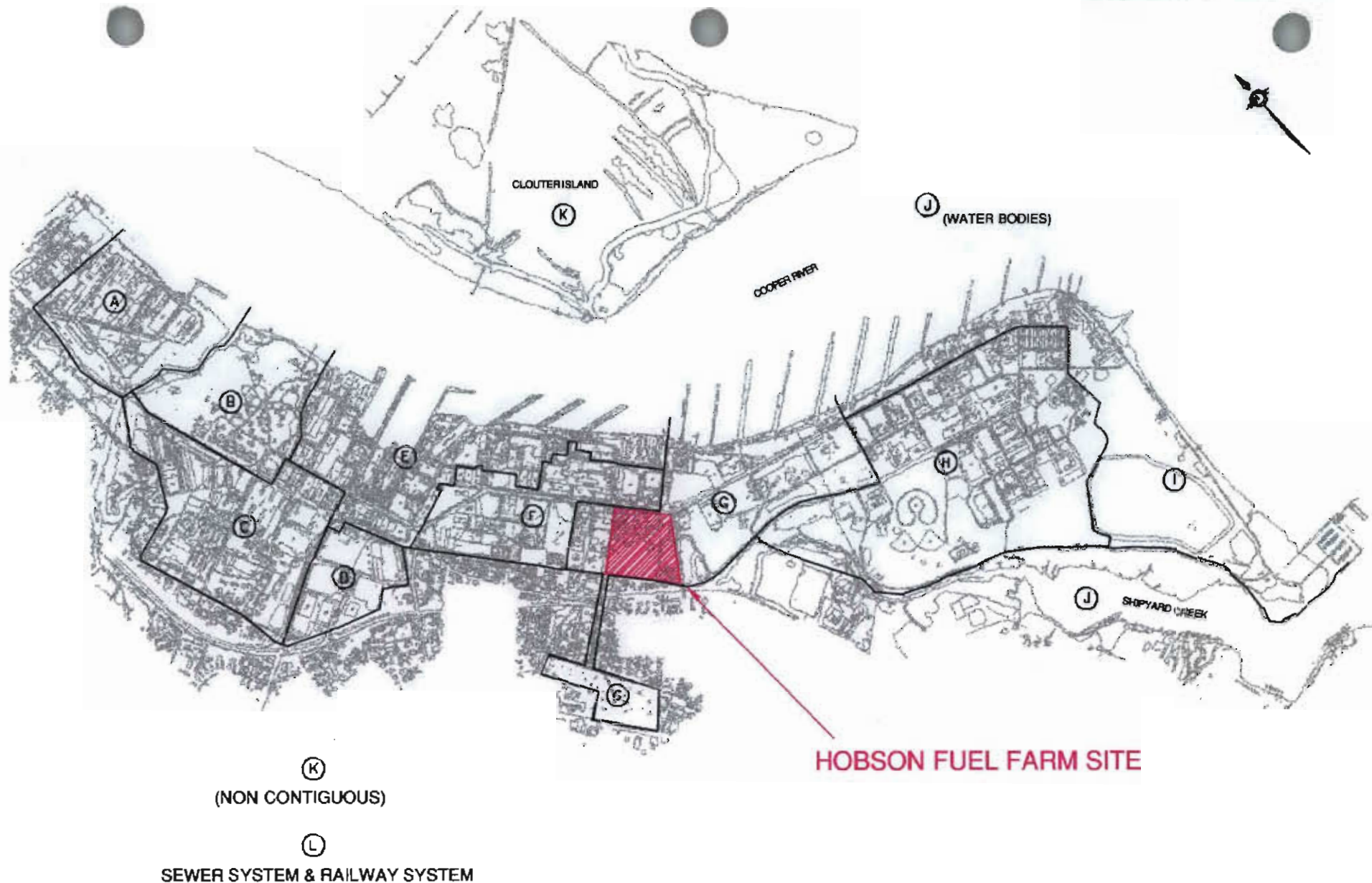
In the area targeted for redevelopment, tanks 3916 and 3917, surface soil exhibited no petroleum related or RCRA constituents which might be a concern. Subsurface soil was only a potential concern at location HFFSP008, where petroleum related SVOCs were detected at concentrations that have the potential to leach to shallow groundwater. This area is a single point exceedance that has been fully delineated should the Navy decide to mitigate the problem. However, EnSafe feels there is no leaching concern because of the conservative screening levels used.

Considering that a building over the site would inhibit percolation and subsequent potential for leaching, the Navy may choose to manage the risk in other ways rather than perform a soil removal at the HFF.

5.0 REFERENCES

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FIGURES

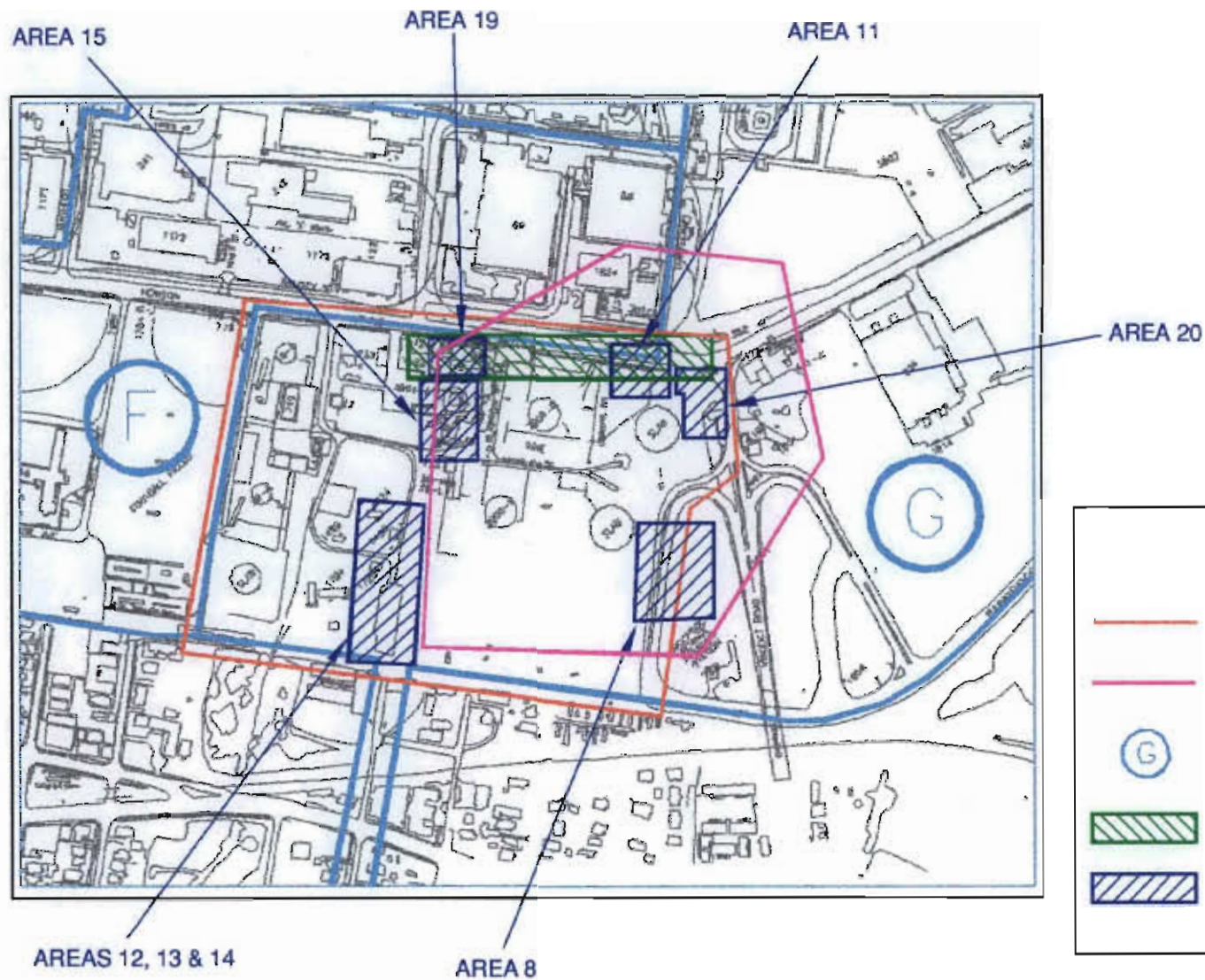


HOBSON FUEL FARM
SITE ASSESSMENT REPORT
CHARLESTON NAVAL COMPLEX
CHARLESTON, SC

FIGURE 1-1
LOCATION OF HOBSON FUEL FARM

DWG DATE: 11/20/00

DWG NAME: HFF_SM1



LEGEND

- CAR (KEMRON)
- SCAPS (NFESC)
- ⊙ RFI INVESTIGATION ZONE
- ▨ TPH SURVEY (S&ME)
- ▨ FDS CAR (ENSAFE)

GRAPHIC SCALE



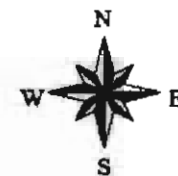
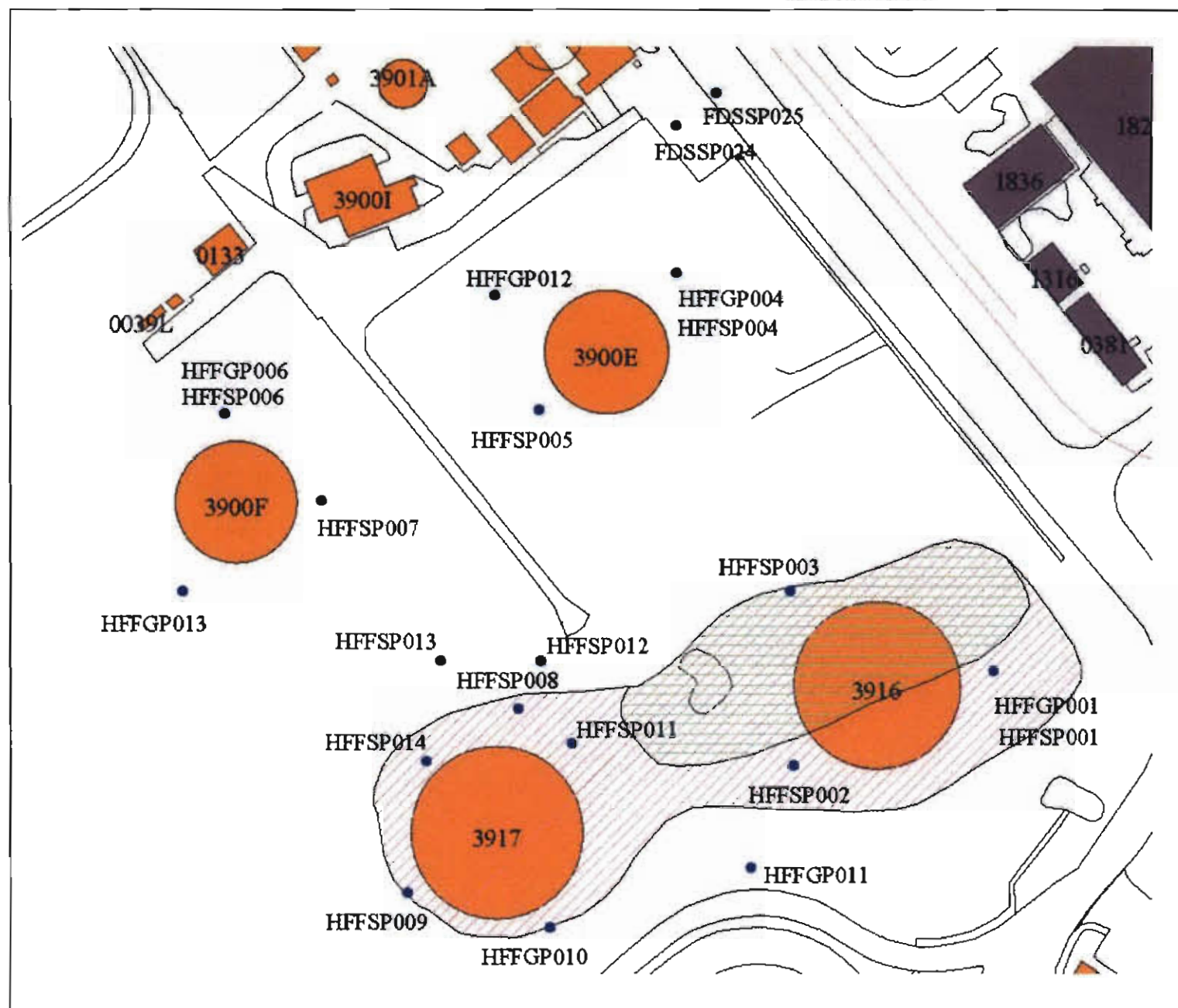
HOBSON FUEL FARM
SITE ASSESSMENT REPORT
CHARLESTON NAVAL COMPLEX
CHARLESTON, SC

FIGURE 1-2
LOCATIONS OF PREVIOUS INVESTIGATIONS

DWG DATE: 11/21/00

DWG NAME: HFF_SM2





**Figure 3-1
DPT Sampling Points
Hobson Fuel Farm**



Legend

HFFGP001 - DPT GW Sampling Point

HFFSP001 - DPT Soil Point

- DPT Sampling Point
-  Est. Contaminated Soil, Kemron, 1996-7
-  Est. Contaminated Soil, Kemron, 1990
-  Zone F
-  Zone G

TABLES

Table 2.1
 Phase I Detected Soil TPH Concentrations
 Fuel Distribution System

Sample ID	Result	Interval	Area
TPH-GRO Gasoline ($\mu\text{g/kg}$)			
FDSSC02501	10.00	Subsurface	
FDSSC03201	27.00	Subsurface	
FDSSC03301	18.00	Subsurface	
FDSSC03501	ND	Subsurface	
FDSSC04301	23.70	Subsurface	
FDSSC04401	35.80	Subsurface	
FDSSC04501	ND	Subsurface	
FDSSC04601	11.10	Subsurface	
FDSSC04701	19000.00	Subsurface	Area 8
FDSSC47A01	ND	Subsurface	
FDSSC04801	8.88	Subsurface	
FDSSC04901	7.12	Subsurface	
FDSSC05001	15.30	Subsurface	
FDSSC05101	42.75*	Subsurface	Area 11
FDSSC05201	8.56	Subsurface	
FDSSC05301	24.60	Subsurface	
FDSSC05401	16.80	Subsurface	
FDSSC06401	8.00	Subsurface	
FDSSC06501	147.00	Subsurface	Area 12
FDSSC06601	67.00	Subsurface	Area 13
FDSSC06701	106.00	Subsurface	Area 14
FDSSC07101	ND	Subsurface	
FDSSC07601	ND	Subsurface	
FDSSC07801	ND	Subsurface	
FDSSC07901	ND	Subsurface	
FDSSC08001	ND	Subsurface	
FDSSC08101	9.00	Subsurface	

Table 2.1
 Phase I Detected Soil TPH Concentrations
 Fuel Distribution System

Sample ID	Result	Interval	Area
FDSSC08201	8.00	Subsurface	
FDSSC08301	8.00	Subsurface	
FDSSC08401	7.00	Subsurface	
FDSSH00101	10.00	Surface	Area 17
FDSSH00201	ND	Surface	
FDSSH00301	ND	Surface	Area 16
FDSSH00401	ND	Surface	
FDSSH00501	ND	Surface	
FDSSH00601	9.00	Surface	
FDSSH00701	ND	Surface	
FDSSH00801	ND	Surface	
FDSSH00901	ND	Surface	
FDSSH01001	ND	Surface	
FDSSH01101	ND	Surface	
FDSSH01201	9.00	Surface	
FDSSH01301	ND	Surface	
FDSSH01401	ND	Surface	
FDSSH01501	ND	Surface	
FDSSH01601	32.00	Surface	
FDSSH01701	ND	Surface	
FDSSH01801	10.00	Surface	
FDSSH01901	ND	Surface	
FDSSH02001	ND	Surface	
FDSSH02101	10.00	Surface	
FDSSH02201	10.00	Surface	
FDSSH02301	501.00	Surface	Area 15

Notes:

a = Average of original duplicate concentrations. Original sample concentration was 77.6 µg/kg.

b = Included based on visual observation of gross contamination.

ND = Not Detected.

Bolded concentrations exceed 50 µg/kg (GRO) or 50 mg/kg (DRO).

Table 2.2
 FDS Soil Samples - Phase II
 Fuel Distribution System

Boring Location	Sample Identifier	Date	Sample Interval	Remarks
FDSSC47A	FDSSC47A01	9/24/96	13.5-15.5	No unusual observations logged
FDSSC051	FDSSC05101	1/13/97	5-7	
FDSSC065	FDSSC06501	9/25/96	6.3-10.6	Strong fuel odor noted
FDSSC066	FDSSC06601	12/4/96	8.5-10.5	Strong fuel odor noted
FDSSC067	FDSSC06701	12/4/96	8.5-10.5	Strong fuel odor noted, 173 ppm FID
	FDSSC06701*	12/4/96	8.5-10.5	
FDSSC084	FDSSC08401	10/02/96	7-11	Slight fuel odor noted
FDSSH023	FDSSH02301	10/17/96	0-1	Strong fuel odor noted

Notes:

- 1 = Phase II sample collected concurrently with Phase I TPH sample based on field observations.
 * = Duplicates were analyzed for Appendix IX parameters (metals, pesticides/PCBs, herbicides, organophosphorous (OP) pesticides, dioxins, SVOAs, VOAs); cyanide, and hex-chrome, Level IV.
 FID = Flame ionization detector
 ppm = parts per million.
 Samples analyzed using SW-846 methods (metals, pesticides/PCBs, SVOAs, VOAs) at data quality objective (DQO) Level III.

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Area 8				
TPH - GRO ($\mu\text{g/kg}$)				
Gasoline	FDSSC04701	19000	NL/NL	NA
Volatile Organic Compounds ($\mu\text{g/kg}$)				
Toluene	FDSSC47A01	4	1622/12000	NA
Semivolatile Organic Compounds ($\mu\text{g/kg}$)				
Total Naphthalenes	FDSSC47A01	5210	210/84000	NA
2-Methylnaphthalene	FDSSC47A01	5100	NL/126000	NA
Naphthalene	FDSSC47A01	110	NL/84000	NA
Acenaphthene	FDSSC47A01	430	NL/570000	NA
Anthracene	FDSSC47A01	280	NL/12000000	NA
Benzo(a)anthracene	FDSSC47A01	300	73084/2000	NA
Dibenzofuran	FDSSC47A01	330	NL/50000	NA
Fluoranthene	FDSSC47A01	190	NL/4300000	NA
Fluorene	FDSSC47A01	570	NL/560000	NA
Phenanthrene	FDSSC47A01	1600	NL/1380000	NA
Pyrene	FDSSC47A01	710	NL/4200000	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSC47A01	15000	NL/1000000	23600
Arsenic (As)	FDSSC47A01	16	NL/29	15.5*
Barium (Ba)	FDSSC47A01	27.3	NL/1600	64.5
Beryllium (Be)	FDSSC47A01	1	NL/63	1.63
Calcium (Ca)	FDSSC47A01	30800	NL/NL	NL
Chromium (Cr)	FDSSC47A01	29.6	NL/1000000	43.4*
Cobalt (Co)	FDSSC47A01	5.6	NL/2000	8.14
Copper (Cu)	FDSSC47A01	18.9	NL/920	32.6
Iron (Fe)	FDSSC47A01	19600	NL/NL	NL

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Inorganics (mg/kg)				
Lead (Pb)	FDSSC47A01	30.3	NL/400	66.3
Magnesium (Mg)	FDSSC47A01	4270	NL/NL	NL
Manganese (Mn)	FDSSC47A01	186	NL/1100	291
Mercury (Hg)	FDSSC47A01	0.09	NL/2.1	0.31
Potassium (K)	FDSSC47A01	1870	NL/NL	NL
Selenium (Se)	FDSSC47A01	1.00	NL/5	1.26
Sodium (Na)	FDSSC47A01	2300	NL/NL	NL
Vanadium (V)	FDSSC47A01	42.7	NL/6000	72.5
Zinc (Zn)	FDSSC47A01	77.9	NL/12000	145
Area 11				
TPH - GRO (µg/kg)				
Gasoline	FDSSC05101	42.75	NL/NL	NA
Semivolatile Organic Compounds (µg/kg)				
bis(2-Ethylhexyl)phthalate	FDSSC05101	1500	NL/3600000	NA
Chrysene	FDSSC05101	80	12998/160000	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSC05101	5690	NL/1000000	23600
Barium (Ba)	FDSSC05101	23.3	NL/1600	64.5
Beryllium (Be)	FDSSC05101	0.24	NL/63	1.63
Cadmium (Cd)	FDSSC05101	0.05	NL/8	0.48
Calcium (Ca)	FDSSC05101	1770	NL/NL	NL
Chromium (Cr)	FDSSC05101	6.1	NL/1000000	43.4 ⁴
Cobalt (Co)	FDSSC05101	0.67	NL/2000	8.14
Copper (Cu)	FDSSC05101	2.6	NL/920	32.6
Iron (Fe)	FDSSC05101	4300	NL/NL	NL

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Inorganics (mg/kg)				
Lead (Pb)	FDSSC05101	8.8	NL/400	66.3
Magnesium (Mg)	FDSSC05101	269	NL/NL	NL
Manganese (Mn)	FDSSC05101	27.1	NL/1100	291
Mercury (Hg)	FDSSC05101	0.25	NL/2.1	0.31
Nickel (Ni)	FDSSC05101	2.8	NL/130	18.3
Sodium (Na)	FDSSC05101	175	NL/NL	NL
Thallium (Tl)	FDSSC05101	0.41	NL/0.95	0.95
Vanadium (V)	FDSSC05101	15.5	NL/6000	72.5
Zinc (Zn)	FDSSC05101	9.9	NL/12000	145
Area 12, 13, 14				
TPH - GRO (µg/kg)				
Gasoline	FDSSC06501	147	NL/NL	NA
	FDSSC06601	67		
	FDSSC06701	106		
Volatile Organic Compounds (µg/kg)				
Carbon disulfide	FDSSC06601	2	NL/32000	NA
	FDSSC06701	1		
Toluene	FDSSC06501	47	1622/12000	NA
	FDSSC06601	4		
	FDSSC06701	12		
Xylene (Total)	FDSSC06601	45	42471/148000	NA
	FDSSC06701	3		
Semivolatile Organic Compounds (µg/kg)				
Total Naphthalenes	FDSSC06501	62	210/84000	NA
	FDSSC06601	6500		
	FDSSC06701	4700		
2-Methylnaphthalene	FDSSC06501	62	NL/126000	NA
	FDSSC06601	3100		
	FDSSC06701	4700		
Naphthalene	FDSSC06601	3400	NL/84000	NA
Acenaphthlene	FDSSC06501	130	NL/570000	NA
	FDSSC06601	3000		
	FDSSC06701	1400		
Anthracene	FDSSC06501	110	NL/12000000	NA
	FDSSC06601	3900		
	FDSSC06701	1450		

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Semivolatile Organic Compounds (µg/kg)				
Benzo(a)anthracene	FDSSC06501	86	73084/2000	NA
	FDSSC06601	1890		
	FDSSC06701	1355		
Benzo(b)fluoranthene	FDSSC06501	72	29097/5000	NA
	FDSSC06601	630		
	FDSSC06701	615		
Benzo(k)fluoranthene	FDSSC06601	710	231109/49000	NA
	FDSSC06701	670		
Benzo(a)pyrene	FDSSC06601	930	NL/8000	NA
	FDSSC06701	935		
Benzo(g,h,i)perylene	FDSSC06601	550	NL/4.66E+08	NA
	FDSSC06701	655		
Chrysene	FDSSC06501	70	12998/160000	NA
	FDSSC06601	2000		
	FDSSC06701	1510		
Dibenz(a,h)anthracene	FDSSC06601	120	87866/2000	NA
	FDSSC06701	170		
Dibenzofuran	FDSSC06601	2700	NL/50000	NA
	FDSSC06701	1085		
Di-n-octyl phthalate	FDSSC06701	45	NL/10000000	NA
Fluoranthene	FDSSC06501	120	NL/4300000	NA
	FDSSC06601	6000		
	FDSSC06701	2700		
Fluorene	FDSSC06501	140	NL/560000	NA
	FDSSC06601	4400		
	FDSSC06701	2000		
Indeno(1,2,3-cd)pyrene	FDSSC06601	460	NL/14000	NA
	FDSSC06701	460		
Phenanthrene	FDSSC06501	240	NL/1380000	NA
	FDSSC06601	15000		
	FDSSC06701	6150		
Pyrene	FDSSC06501	290	NL/4200000	NA
	FDSSC06601	5300		
	FDSSC06701	3700		
Dioxin (ng/kg)				
Dioxin(2,3,4,8-TCDD TEQs ¹)	FDSSC06701	0.0847	NL/1900	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSC06501	28400	NL/1000000	23600
	FDSSC06601	15400		
	FDSSC06701	12050		
Antimony (Sb)	FDSSC06501	.51	NL/5	ND
Arsenic (As)	FDSSC06501	17	NL/29	15.5 ²
	FDSSC06601	10.2		
	FDSSC06701	10.35		

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Inorganics (mg/kg)				
Barium (Ba)	FDSSC06501	40.6	NL/1600	64.5
	FDSSC06601	33.9		
	FDSSC06701	25.65		
Beryllium (Be)	FDSSC06501	1.3	NL/63	1.63
	FDSSC06601	.76		
	FDSSC06701	.62		
Calcium (Ca)	FDSSC06501	14500	NL/NL	NL
	FDSSC06601	40000		
	FDSSC06701	24100		
Chromium (Cr)	FDSSC06501	42.9	NL/1000000	43.4 ¹
	FDSSC06601	28.7		
	FDSSC06701	24.55		
Cobalt (Co)	FDSSC06501	6.3	NL/2000	8.14
	FDSSC06601	3.4		
	FDSSC06701	3.1		
Copper (Cu)	FDSSC06501	24.8	NL/920	32.6
	FDSSC06601	18.5		
	FDSSC06701	14.25		
Iron (Fe)	FDSSC06501	30700	NL/NL	NL
	FDSSC06601	17800		
	FDSSC06701	23900		
Lead (Pb)	FDSSC06501	42.9	NL/400	66.3
	FDSSC06601	28.2		
	FDSSC06701	27.6		
Magnesium (Mg)	FDSSC06501	4840	NL/NL	NL
	FDSSC06601	6460		
	FDSSC06701	2585		
Manganese (Mn)	FDSSC06501	582	NL/1100	291
	FDSSC06601	163		
	FDSSC06701	238.5		
Mercury (Hg)	FDSSC06501	.22	NL/2.1	0.31
	FDSSC06601	.2		
	FDSSC06701	.175		
Nickel (Ni)	FDSSC06501	13.9	NL/130	18.3
	FDSSC06601	10.1		
	FDSSC06701	8.15		
Potassium (K)	FDSSC06501	2580	NL/NL	NL
	FDSSC06601	2260		
	FDSSC06701	1455		
Selenium (Se)	FDSSC06501	1.1	NL/5	1.26
	FDSSC06701	.87		
Sodium (Na)	FDSSC06601	5770	NL/NL	NL
	FDSSC06701	2340		
Thallium (Tl)	FDSSC06501	.57	NL/0.95	0.95
Vanadium (V)	FDSSC06501	69.1	NL/6000	72.5
	FDSSC06601	30.2		
	FDSSC06701	34.8		

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Inorganics (mg/kg)				
Zinc (Zn)	FDSSC06501	97	NL/12000	145
	FDSSC06601	69		
	FDSSC06701	58.55		
Area 15				
TPH - GRO (µg/kg)				
Gasoline	FDSSH02301	501	NL/NL	NA
Volatile Organic Compounds (µg/kg)				
1,1-Dichloroethane	FDSSH02301	85	NL/23000	NA
1,1,1-Trichloroethane	FDSSH02301	48	NL/2000	NA
Benzene	FDSSH02302	2	5/30	NA
Ethylbenzene	FDSSH02301	130	7800000/13000	NA
Methylene Chloride	FDSSH02302	2	NL/20	NA
Tetrachloroethene	FDSSH02301	13	NL/60	NA
Toluene	FDSSH02301	22	160000000/12000	NA
Xylene (Total)	FDSSH02301	1800	160000000/148000	NA
Semivolatile Organic Compounds (µg/kg)				
Total Naphthalenes	FDSSH02301	8500	3100000/84000	NA
	FDSSH02302	25	210/84000	
2-Methylnaphthalene	FDSSH02301	6800	NL/126000	NA
Naphthalene	FDSSH02301	1700	NL/84000	NA
bis(2-ethylhexyl)phtharate	FDSSH02302	25	NL/3600000	NA
	FDSSH02302	130	NL/3600000	
Chrysene	FDSSH02301	240	88000/160000	NA
Fluorene	FDSSH02301	1900	NL/560000	NA
Phenanthrene	FDSSH02301	1900	NL/1360000	NA
Pyrene	FDSSH02301	590	NL/4200000	NA
Pesticides (µg/kg)				
4,4-DDE	FDSSH02302	12	NL/34000	NA
Endrin	FDSSH02301	20	NL/1000	NA

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Pesticides ($\mu\text{g/kg}$)				
Aroclor-1260	FDSSH02302	53	NL/1000	NA
Heptachlor	FDSSH02301	5.3	NL/23000	NA
Heptachlor epoxide	FDSSH02302	2.8	NL/23000	NA
gamma-Chlordane	FDSSH02301 FDSSH02302	3.4 3.2	NL/10000	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSH02301 FDSSH02302	2820 6950	NL/1000000	18700
Arsenic (As)	FDSSH02301 FDSSH02302	1.8 2.4	NL/29	17.2
Barium (Ba)	FDSSH02301 FDSSH02302	13.1 31.3	NL/1600	109
Beryllium (Be)	FDSSH02302	0.31	NL/63	1.2
Cadmium (Cd)	FDSSH02301	0.19	NL/8	1.07
Calcium (Ca)	FDSSH02301 FDSSH02302	13,100 1,220	NL/NL	NL
Chromium (Cr)	FDSSH02301 FDSSH02302	9.3 13.5	NL/1000000	42.8
Cobalt (Co)	FDSSH02301 FDSSH02302	1.3 1.5	NL/2000	6.60
Copper (Cu)	FDSSH02302	2.4	NL/920	30.4
Iron (Fe)	FDSSH02301 FDSSH02302	4,860 10,500	NL/NL	NL
Lead (Pb)	FDSSH02301 FDSSH02302	29.5 7.9	NL/400	181
Magnesium (Mg)	FDSSH02301 FDSSH02302	499 646	NL/NL	NL
Manganese (Mn)	FDSSH02301 FDSSH02302	29.6 34.3	NL/1100	325
Mercury (Hg)	FDSSH02301 FDSSH02302	0.07 0.05	NL/2.1	1.03
Nickel (Ni)	FDSSH02301 FDSSH02302	4.2 2.9	NL/130	206

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Inorganics (mg/kg)				
Potassium (K)	FDSSH02301	240	NL/NL	NL
	FDSSH02302	321		
Selenium (Se)	FDSSH02302	0.51	NL/5	1.24
Sodium (Na)	FDSSH02302	249	NL/NL	NL
Thallium (Tl)	FDSSH02301	0.47	NL/0.95	0.85
Tin (Sn)	FDSSH02302	4.9	NL/11,088	NL
Vanadium (V)	FDSSH02301	10.6	NL/6000	60.9
	FDSSH02302	16.1		
Zinc (Zn)	FDSSH02301	66.8	NL/12000	519
	FDSSH02302	14.8		
Other Areas				
TPH - GRO ($\mu\text{g/kg}$)				
Gasoline	FDSSC08401	7	NL/NL	NA
Semivolatile Organic Compounds ($\mu\text{g/kg}$)				
Fluoranthene	FDSSC08401	75	NL/4300000	NA
Phenanthrene	FDSSC08401	100	NL/1380000	NA
Pyrene	FDSSC08401	54	NL/4200000	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSC08401	5060	NL/1000000	18700
Arsenic (As)	FDSSC08401	2.2	NL/29	17.2
Barium (Ba)	FDSSC08401	19.4	NL/1600	109
Beryllium (Be)	FDSSC08401	0.31	NL/63	1.63
Calcium (Ca)	FDSSC08401	1560	NL/NL	NL
Chromium (Cr)	FDSSC08401	8.1	NL/1000000	42.8
Cobalt (Co)	FDSSC08401	0.71	NL/2000	6.60
Iron (Fe)	FDSSC08401	6050	NL/NL	NL
Lead (Pb)	FDSSC08401	5.6	NL/400	181
Magnesium (Mg)	FDSSC08401	1150	NL/NL	NL

Table 2.3
 Analytes Detected in Soil
 Fuel Distribution System

Parameters	Location	Conc.	RBSL/SSL	Background
Inorganics (mg/kg)				
Manganese (Mn)	FDSSC08401	8.3	NL/1100	325
Nickel (Ni)	FDSSC08401	4.7	NL/130	206
Potassium (K)	FDSSC08401	440	NL/NL	NL
Vanadium (V)	FDSSC08401	10.5	NL/6000	60.9
Zinc (Zn)	FDSSC08401	9.0	NL/12000	519

Notes:

a = Background value for non-clay samples.

NL = Not listed.

NA = Not applicable.

µg/kg = Micrograms per kilogram.

mg/kg = Milligrams per kilogram.

RBSLs from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) and soil-to-groundwater SSLs (DAF=20) from the *Soil Screening Guidance: Technical Background Document* (USEPA, 1996b) were used as reference concentrations.

Bolded concentrations exceed RBSL or the SSL (if no RBSL is available).

All background values for Zone G are based on twice the mean of grid sample concentrations.

Table 2.4
 FDS Groundwater Samples
 Fuel Distribution System

Well Number	Sample Identifier	Date Sampled	Remarks
Area 8			
FDS08A	FDS08A01	1/24/97	Area 8 associated with FDSSC047 and FDSSC47A: elevated TPH-GRO/SVOCs
	FDS08A02	6/05/97	
FDS08B	FDS08B01	1/25/97	
	FDS08B02	6/09/97	
FDS08C	FDS08C01*	1/24/97	*duplicate sample also collected
	FDS08C02*	6/09/97	
FDS08D	FDS08D01	3/05/99	Sampled for metals, VOAs, SVOAs only
Area 11			
FDS11A	FDS11A01	1/28/97	Area 11 associated with FDSSC051, elevated TPH-GRO
	FDS11A02	6/11/97	
FDS11B	FDS11B01	1/28/97	
	FDS11B02	6/11/97	
FDS11C	FDS11C01*	1/28/97	*duplicate sample also collected
	FDS11C02*	6/11/97	
Area 12			
FDS12A	FDS12A01*	1/27/97	Area 12 associated with FDSSC065; elevated TPH-GRO/inorganics *duplicate sample also collected
	FDS12A02*	6/11/97	
FDS12B	FDS11B01	1/27/97	
	FDS11B02	6/11/97	
Area 13			
FDS13A	FDS13A01	1/27/97	Area 13 associated with FDSSC066; elevated TPH-GRO/SVOCs
	FDS13A02	6/11/97	
FDS13B	FDS13B01	1/27/97	
	FDS13B02	6/13/97	
FDS13C	FDS13C01	1/27/97	
	FDS13C02	6/12/97	
FDS13D	FDS13D01	1/27/97	
	FDS13D02	6/12/97	
FDS13E	FDS13E01	1/28/97	
	FDS13E02	6/13/97	

Table 2.4
 FDS Groundwater Samples
 Fuel Distribution System

Well Number	Sample Identifier	Date Sampled	Remarks
Area 14			
FDS14A	FDS14A01	1/27/97	Area 14 associated with FDSSC067; elevated TPH-GRO/SVOCs/inorganics
	FDS14A02	6/12/97	
FDS14B	FDS14B01	1/27/97	
	FDS14B02	6/12/97	
FDS14C	FDS14C01	1/27/97	
	FDS14C02	6/13/97	
Area 15			
FDS15A	FDS15A01	1/28/97	Area 15 associated with FDSSH023; elevated TPH-GRO/inorganics
	FDS15A02	6/13/97	
FDS15B	FDS15B01	1/28/97	
	FDS15B02	6/16/97	
FDS15C	FDS15C01	1/28/97	
	FDS15C02	6/16/97	

Notes:

* = Duplicates; analyzed for Appendix IX parameters (metals, pesticides/PCBs, herbicides, OP pesticides, dioxins, SVOAs, VOAs); cyanide, and hex-chrome, at DQO Level IV.

Samples analyzed using SW-846 methods (metals, pesticides/PCBs, SVOAs, VOAs) at DQO Level III. First-round samples also analyzed for cyanide.

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Area 8					
Semivolatile Organic Compounds (µg/L)					
Total PAHs	FDS08B	46	21	25/NL	NA
Acenaphthene	FDS08B	17	6	10/220	NA
Anthracene	FDS08B	2	ND	10/1100	NA
Fluoranthene	FDS08B	6	4	10/150	NA
Fluorene	FDS08B	9	4	10/150	NA
2-Methylnaphthalene	FDS08B	2	2	10/150	NA
Phenanthrene	FDS08B	6	5	10/150	NA
Pyrene	FDS08B	4	2	10/110	NA
Benzoic acid	FDS08B	2	1	NL/15000	NA
Benzyl alcohol	FDS08C	ND	3	NL/1100	NA
Butylbenzylphthalate	FDS08C	ND	5	NL/730	NA
Dibenzofuran	FDS08B	4	2	NL/15	NA
Di-n-butylphthalate	FDS08C	ND	1	NL/370	NA
Inorganics (µg/L)					
Aluminum (Al)	FDS08A	8900	381	NL/3700	692
	FDS08B	682	116		
	FDS08C	ND	72		
Antimony (Sb)	FDS08B	ND	2.7	NL/1.5	4.85
Arsenic (As)	FDS08A	20.6	16.4	50/4.5E-02	17.8
	FDS08B	6.5	6.6		
	FDS08C	3.4	3.8		
Barium (Ba)	FDS08A	54.4	22.2	2000/260	31
	FDS08B	179	89.8		
	FDS08C	131	72.6		
	FDS08D	38.9			
Beryllium (Be)	FDS08A	1.3	ND	NL/1.6E-02	ND
	FDS08C	0.66	ND		

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Calcium (Ca)	FDS08A	88100	76500	NL/NL	NL
	FDS08B	83800	90000		
	FDS08C	170000	244000		
Chromium (Cr)	FDS08A	18.9	ND	100/18	3.88
	FDS08B	4.8	2.3		
Cobalt (Co)	FDS08A	3.1	ND	NL/720	1.45
	FDS08B	3.5	2.8		
	FDS08C	2.0	0.85		
Copper (Cu)	FDS08A	6.4	2.3	NL/13000	8.33
Iron (Fe)	FDS08A	15500	8630	NL/NL	NL
	FDS08B	3040	23800		
	FDS08C	828	1445		
Lead (Pb)	FDS08A	8.4	ND	15/15	4.6
Magnesium (Mg)	FDS08A	41900	37600	NL/NL	NL
	FDS08B	160000	157000		
	FDS08C	169000	127500		
Manganese (Mn)	FDS08A	304	275	NL/84	2906
	FDS08B	386	561		
	FDS08C	332	435		
Nickel (Ni)	FDS08A	8	1	NL/73	4.08
	FDS08B	13	1.6		
	FDS08C	5.8	0.88		
Potassium (K)	FDS08A	20500	20900	NL/NL	NL
	FDS08B	71500	63800		
	FDS08C	68600	51750		
Silver (Ag)	FDS08C	ND	1.4	5/18	1.65
Sodium (Na)	FDS08A	114000	59000	NL/NL	NL
	FDS08B	1960000	1850000		
	FDS08C	1210000	598000		
Thallium (Tl)	FDS08A	4.1	ND	NL/0.29	ND
	FDS08B	5.8	7.8		
	FDS08C	8.4	ND		
Vanadium (V)	FDS08A	22.9	4.5	NL/26	15.4
	FDS08B	13.1	6.6		
	FDS08C	2.8	18.1		
Zinc (Zn)	FDS08A	36	ND	NL/1100	15.6

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Area 11					
Volatile Organic Compounds (µg/L)					
Chloromethane	619003	8.0	ND	NL/1.4	NA
Toluene	FDS11C	1	ND	1000/75	NA
Semivolatile Organic Compounds (µg/L)					
Total PAHs	FDS11A 619003	1 13	2 1	25/NL	NA
Acenaphthene	FDS11A 619003	1.0 2.0	2.0 ND	10/220	NA
Fluorene	619003	4.0	ND	10/150	NA
2-Methylnaphthalene	619003	3.0	ND	10/150	NA
Naphthalene	619003	2.0	1.0	10/150	NA
Phenanthrene	619003	2.0	ND	10/150	NA
Aniline	FDS11C	5	NT	NL/1	NA
Benzoic Acid	FDS11A FDS11C	7 ND	ND 19	NL/15000	NA
Dibenzofuran	619003	2.0	ND	NL/15	NA
4-Methylphenol (p-Cresol)	FDS11C 619003	ND 6.0	2.0 ND	NL/18	NA
Dioxin (pg/L)					
Dioxin (2,3,7,8-TCDD TEQs ¹)	FDS11C	0.1694	NT	NL/0.45	NA
Inorganics (µg/L)					
Aluminum (Al)	FDS11A FDS11B FDS11C 619003	209 174 466 233	395 86.2 169 10.3	NL/3700	692
Antimony (Sb)	FDS11A FDS11B FDS11C 619003	5.1 4.2 4.0 ND	ND ND ND 4.9	NL/1.5	4.85

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC ($\mu\text{g/L}$)	Shallow Background
Inorganics ($\mu\text{g/L}$)					
Arsenic (As)	FDS11A	2.9	ND	50/4.5E-02	17.8
	FDS11C	3.2	2.9		
	619003	3.0	8.0		
Barium (Ba)	FDS11A	39.8	27.9	2000/260	31
	FDS11B	68.9	54		
	FDS11C	57.8	51.1		
	619003	92.2	69.2		
Beryllium (Be)	619003	ND	0.39	NL/016	ND
Calcium (Ca)	FDS11A	101000	105000	NL/NL	NL
	FDS11B	93200	84500		
	FDS11C	125500	77800		
	619003	205000	200000		
Chromium (Cr)	FDS11A	0.96	1	100/18	3.88
	FDS11B	0.92	ND		
	FDS11C	1.1	ND		
	619003	1.0	1.5		
Cobalt (Co)	619003	ND	1.4	NL/220	1.45
Cyanide (CN)	FDS11B	3.2	NT	NL/73	3.8
	FDS11C	2.2	NT		
Iron (Fe)	FDS11A	2260	2920	NL/NL	NL
	FDS11B	15800	17300		
	FDS11C	7690	7120		
	619003	32000	17000		
Magnesium (Mg)	FDS11A	34000	28500	NL/NL	NL
	FDS11B	67900	54100		
	FDS11C	191300	99650		
	619003	356000	497000		
Manganese (Mn)	FDS11A	300	348	NL/84	2,906
	FDS11B	913	814		
	FDS11C	527	500		
	619003	1420	702		
Mercury (Hg)	FDS11C	ND	0.11	2/1.1	ND
Nickel (Ni)	FDS11A	0.96	ND	NL/73	4.08
	FDS11B	3	ND		
	FDS11C	1	ND		
	619003	ND	1.5		

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Potassium (K)	FDS11A	27300	18300	NL/NL	NL
	FDS11B	38200	31200		
	FDS11C	54050	39650		
	619003	163000	158000		
Sodium (Na)	FDS11A	380000	185000	NL/NL	NL
	FDS11B	587000	433000		
	FDS11C	908000	1030000		
	619003	3840000	4600000		
Thallium (Tl)	619003	6.6	ND	NL/0.29	ND
Tin (Sn)	FDS11C	3.3	ND	NL/2200	ND
Vanadium (V)	FDS11A	0.67	ND	NL/26	15.4
	FDS11B	ND	ND		
	FDS11C	0.67	ND		
	619003	ND	7.5		
Areas 12, 13, & 14					
Semivolatile Organic Compounds (µg/L)					
Total PAHs	FDS13A	1	5	25/NL	NA
2-Methylnaphthalene	FDS13A	1	5	10/150	NA
4-Nitrophenol	FDS14A	ND	1	NL/230	NA
Benzoic acid	FDS13A	2	ND	NL/15000	NA
	FDS13B	2	ND		
	FDS14A	ND	2		
	FDS14B	ND	1		
Inorganics (µg/L)					
Aluminum (Al)	FDS12A	514	288	NL/3700	692
	FDS12B	ND	213		
	FDS13A	1360	692		
	FDS13B	787	74.4		
	FDS13C	1730	1600		
	FDS13D	1850	2820		
	FDS13E	215	1290		
	FDS14A	ND	2940		
	FDS14B	ND	201		
	FDS14C	738	250		
	GDG002	176	ND		
	Antimony (Sb)	FDS13E	3.4		
GDG002		ND	3.8		

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Arsenic (As)	FDS12A	6.55	22.95	50/0.045	17.8
	FDS12B	28	49.3		
	FDS13A	27	210		
	FDS13B	5.2	16.8		
	FDS13C	3.9	6		
	FDS13D	ND	16.7		
	FDS13E	22.5	29.9		
	FDS14A	50.3	21.8		
	FDS14B	6.9	22.5		
	FDS14C	14	24.9		
	GDC002	7.8	10		
Barium (Ba)	FDS12A	268	196.5	2000/260	31
	FDS12B	78.9	70.4		
	FDS13A	138	28.1		
	FDS13B	144	29.8		
	FDS13C	27.3	17		
	FDS13D	35.6	31.9		
	FDS13E	32.9	30.4		
	FDS14A	45.2	59.6		
	FDS14B	52	46.2		
	FDS14C	51.5	33.1		
	GDC002	13.6	17.4		
Beryllium (Be)	FDS13B	.45	ND	NL/0.016	ND
	FDS13C	.53	ND		
	FDS14C	.64	ND		
Cadmium (Cd)	FDS12A	ND	.46	5/1.8	0.53
	FDS12B	ND	.52		
	FDS13A	ND	.44		
	FDS13C	ND	.68		
	FDS14A	ND	.31		
	FDS14B	ND	.41		
	GDC002	ND	.4		
Calcium (Ca)	FDS12A	274500	215500	NL/NL	NL
	FDS12B	172000	160000		
	FDS13A	161000	155000		
	FDS13B	197000	185000		
	FDS13C	69800	49400		
	FDS13D	8930	3580		
	FDS13E	155000	161000		
	FDS14A	177000	137000		
	FDS14B	127000	137000		
	FDS14C	201000	151000		
	GDC002	91400	90700		

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC ($\mu\text{g/L}$)	Shallow Background
Inorganics ($\mu\text{g/L}$)					
Chromium (Cr)	FDS12A	1.2	ND	100/18	3.88
	FDS12B	.82	ND		
	FDS13A	4.2	1.9		
	FDS13B	2.6	1.9		
	FDS13C	1.3	2.9		
	FDS13D	3.6	5.3		
	FDS13E	ND	3.3		
	FDS14A	2	9.6		
	FDS14B	4.3	2.8		
	FDS14C	1.4	2.4		
Cobalt (Co)	FDS12A	17.85	18.7	NL/220	1.45
	FDS12B	31	29.6		
	FDS13A	4.1	ND		
	FDS13B	3.1	1.9		
	FDS13C	29	23.4		
	FDS13D	3.4	1.4		
	FDS14A	1.9	2.1		
	FDS14B	3	1.6		
	FDS14C	1.6	.98		
Copper (Cu)	FDS13A	5.2	ND	NL/13000	8.33
	FDS13B	ND	2.2		
	FDS13D	ND	1.8		
	FDS14A	ND	3.7		
	FDS14B	3.8	ND		
	FDS14C	5	ND		
Cyanide (CN)	FDS13E	2.6	NT	NL/73	3.8
	FDS14B	2.2	NT		
	FDS14C	8.4	NT		
Iron (Fe)	FDS12A	10800	19850	NL/NL	NL
	FDS12B	18500	32200		
	FDS13A	14700	37200		
	FDS13B	2110	9150		
	FDS13C	73800	64500		
	FDS13D	4640	8280		
	FDS13E	10700	19000		
	FDS14A	20100	15600		
	FDS14B	4240	25600		
	FDS14C	2830	4930		
	GDG002	28200	35700		
Lead (Pb)	FDS13A	ND	1	15/15	4.6
	FDS13D	ND	1.9		
	FDS13E	ND	1.3		
	FDS14A	ND	3.5		

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC ($\mu\text{g/L}$)	Shallow Background
Inorganics ($\mu\text{g/L}$)					
Magnesium (Mg)	FDS12A	58000	53400	NL/NL	NL
	FDS12B	106000	112000		
	FDS13A	203000	75700		
	FDS13B	428000	214000		
	FDS13C	153000	113000		
	FDS13D	6130	2730		
	FDS13E	131000	137000		
	FDS14A	257000	281000		
	FDS14B	266000	217000		
	FDS14C	170000	197000		
Manganese (Mn)	GDG002	100000	81000	NL/84	2906
	FDS12A	3650	3180		
	FDS12B	3370	3240		
	FDS13A	1370	2480		
	FDS13B	286	292		
	FDS13C	1680	1300		
	FDS13D	163	73.7		
	FDS13E	1540	1660		
	FDS14A	607	354		
	FDS14B	329	405		
Nickel (Ni)	FDS14C	3360	1510	NL/73	4.08
	GDG002	2630	2820		
	FDS12A	9.2	4.85		
	FDS12B	9.6	6.2		
	FDS13A	11	ND		
	FDS13B	7.7	4		
	FDS13C	10.5	7.9		
	FDS13D	4.8	2.2		
	FDS13E	.94	.82		
	FDS14A	ND	4.8		
Potassium (K)	FDS14B	7.7	1.4	NL/NL	NL
	FDS14C	ND	2.3		
	GDG002	2	ND		
	FDS12A	7140	5935		
	FDS12B	41200	43900		
	FDS13A	75200	42100		
	FDS13B	123000	86500		
	FDS13C	40300	30300		
	FDS13D	3610	2910		
	FDS13E	57400	67000		
Selenium (Se)	FDS14A	91500	109000	50/18	4.3
	FDS14B	90000	81600		
	FDS14C	63100	94300		
	GDG002	46400	49800		
	GDG002	ND	4.1		
Silver (Ag)	GDG002	1.7	ND	5/18	1.65

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Sodium (Na)	FDS12A	427000	388000	NL/NL	NL
	FDS12B	876000	1010000		
	FDS13A	1850000	425000		
	FDS13B	3860000	2080000		
	FDS13C	1620000	1260000		
	FDS13D	163000	104000		
	FDS13E	538000	795000		
	FDS14A	1970000	2510000		
	FDS14B	2240000	2020000		
	FDS14C	1030000	1750000		
GDG002	694000	576000			
Thallium (Tl)	FDS12A	4.5	ND	NL/0.29	ND
	FDS12B	3.2	ND		
	FDS13A	5.7	ND		
	FDS13B	7.1	ND		
	FDS13D	4.2	ND		
	FDS14A	3.5	ND		
	FDS14B	3.2	ND		
	FDS14C	5.3	ND		
Vanadium (V)	FDS12A	1.35	ND	NL/26	15.4
	FDS13A	4.7	5.1		
	FDS13B	9.1	20.5		
	FDS13C	1.6	2.9		
	FDS13D	3.7	6.1		
	FDS13E	3.7	5.3		
	FDS14A	5	20.2		
	FDS14B	8.4	13.2		
	FDS14C	5.4	17.3		
	GDG002	2.7	3.1		
Zinc (Zn)	FDS12A	ND	8.4	NL/1100	15.6
	FDS12B	ND	16.3		
	FDS13A	ND	7.8		
	FDS13C	ND	21.7		
	FDS13D	ND	12.9		
	FDS14A	ND	10.4		
Area 15					
Volatile Organic Compounds (µg/L)					
Toluene	FDS15A	3	ND	1000/75	NA
Chlorobenzene	FDS15A	6	ND	NL/3.9	NA
Semivolatile Organic Compounds (µg/L)					
Phenol	FDS15A	1	ND	NL/2200	NA
4-Methylphenol (p-cresol)	FDS15A	23	2	NL/18	NA

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Semivolatile Organic Compounds (µg/L)					
Benzoic acid	FDS15A	6	ND	NL/15000	NA
Pesticides/PCBs (µg/L)					
beta-BHC	FDS15A	0.057	ND	NL/0.037	NA
Inorganics (µg/L)					
Aluminum (Al)	FDS15A	100	503	NL/3700	692
	FDS15B	3,010	209		
	FDS15C	962	474		
Antimony (Sb)	FDS15C	3.5	ND	NL/1.5	4.85
Arsenic (As)	FDS15A	19.4	26.7	50/0.045	17.8
	FDS15B	4.1	4.6		
Barium (Ba)	FDS15A	55.2	94.5	2000/260	31
	FDS15B	68.6	70.6		
	FDS15C	159	153		
Calcium (Ca)	FDS15A	126000	235000	NL/NL	NL
	FDS15B	98800	119000		
	FDS15C	268000	284000		
Chromium (Cr)	FDS15A	0.92	1.5	100/18	3.88
	FDS15B	4.7	ND		
	FDS15C	1.9	ND		
Cobalt (Co)	FDS15B	8.1	6.8	NL/220	1.45
	FDS15C	1.3	ND		
Copper (Cu)	FDS15A	3.6	ND	NL/13000	8.33
Cyanide (CN)	FDS15A	3	NT	NL/73	3.8
	FDS15B	7	NT		
Iron (Fe)	FDS15A	4920	6620	NL/NL	NL
	FDS15B	2060	675		
	FDS15C	1920	3040		
Magnesium (Mg)	FDS15A	12200	15800	NL/NL	NL
	FDS15B	26200	22800		
	FDS15C	19300	14000		
Manganese (Mn)	FDS15A	721	515	NL/84	2906
	FDS15B	1050	813		
	FDS15C	806	465		

Table 2.5
 Analytes Detected in Groundwater
 Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Inorganics (µg/L)					
Nickel (Ni)	FDS15A	3.7	0.84	NL/73	4.08
	FDS15B	3.2	1.6		
	FDS15C	1.7	0.9		
Potassium (K)	FDS15A	10800	5130	NL/NL	NL
	FDS15B	7410	8050		
	FDS15C	3440	3450		
Sodium (Na)	FDS15A	78300	157000	NL/NL	NL
	FDS15B	92400	158000		
	FDS15C	117000	114000		
Thallium (Tl)	FDS15C	3.3	ND	NL/0.29	ND
Vanadium (V)	FDS15A	1.3	1.6	NL/26	15.4
	FDS15B	6	1.1		
	FDS15C	1.9	1.6		

Notes:

NL = Not listed.

NA = Not applicable.

ND = Not detected.

NT = Not taken.

µg/L = Micrograms per liter.

pg/L = Picograms per liter.

I = Calculated from methods described in USEPA Interim Supplemental Guidance to RAGS: Human Health Risk Assessment, Bulletin 2 (USEPA, 1995).

RBSLs from the South Carolina Risk-Based Corrective Action for Petroleum Releases (SCDHEC, January 5, 1998) and tap water RBCs (THQ=0.1) from Risk Based Concentration Table (USEPA, October 22, 1997) were used as reference concentrations.

Bolded concentration exceed RBSL or the Tap Water RBC (if no RBSL is available).

All background values for Zone G are based on twice the means of the grid sample concentrations. Background values for groundwater are based on two sampling rounds in two wells at each depth.

Table 2.6
 Areas 19 and 20
 DPT Soil and Groundwater Samples and Analyses
 Fuel Distribution System

Sample Location	Sample Identifier	Medium	Date Collected	Analyses
Area 19				
P001	F19SP00106	Soil	1/21/99	VOCs, SVOCs
	F19GP00101	Groundwater	4/12/99	"
P002	F19SP00205	Soil	1/21/99	VOCs, SVOCs
	F19GP00201	Groundwater	4/12/99	"
P003	F19SP00305	Soil	1/21/99	VOCs, SVOCs
	F19GP00301	Groundwater	4/12/99	"
P004	F19SP00406	Soil	1/22/99	VOCs, SVOCs
	F19GP00401	Groundwater	4/12/99	"
P005	F19SP00505	Soil	1/21/99	VOCs, SVOCs
	F19GP00501	Groundwater	4/12/99	"
P006	F19SP00604	Soil	1/21/99	VOCs, SVOCs
P007	F19SP00706	Soil	1/21/99	VOCs, SVOCs
P009	F19SP00909	Soil	5/07/99	VOCs, SVOCs
	F19GP00901	Groundwater	5/10/99	"
P010	F19SP01005	Soil	5/07/99	VOCs, SVOCs
	F19GP01001	Groundwater	5/10/99	"
P011	F19SP01105	Soil	5/07/99	VOCs, SVOCs
	F19GP01101	Groundwater	5/10/99	"
P012	F19SP01205	Soil	5/07/99	VOCs, SVOCs
	F19GP01201	Groundwater	5/10/99	"
P013	F19SP01311	Soil	6/23/99	VOCs, SVOCs
	F19GP01301	Groundwater	6/24/99	"
P014	F19SP01407	Soil	6/23/99	VOCs, SVOCs
	F19GP01401	Groundwater	6/24/99	"
P015	F19SP01507	Soil	6/23/99	VOCs, SVOCs
	F19GP01501	Groundwater	6/28/99	"
P016	F19SP01611	Soil	6/23/99	VOCs, SVOCs
	F19GP01601	Groundwater	6/28/99	"
P017	F19SP01711	Soil	6/23/99	VOCs, SVOCs
	F19GP01701	Groundwater	6/28/99	"
P018	F19SP01811	Soil	6/23/99	VOCs, SVOCs
	F19GP01801	Groundwater	6/28/99	"
P019	F19SP01912	Soil	6/23/99	VOCs, SVOCs
	F19GP01901	Groundwater	6/28/99	"

Table 2.6
 Areas 19 and 20
 DPT Soil and Groundwater Samples and Analyses
 Fuel Distribution System

Sample Location	Sample Identifier	Medium	Date Collected	Analyses
P020	F19SP02010	Soil	6/23/99	VOCs, SVOCs
	F19GP02001	Groundwater	6/28/99	"
P021	F19SP02103	Soil	10/02/00	VOCs, SVOCs
	F19CP02101	"	"	"
P022	F19SP02203	Soil	10/02/00	VOCs, SVOCs
P023	F19SP02303	Soil	10/02/00	VOCs, SVOCs
P024	F19SP02403	Soil	11/15/00	VOCs, SVOCs
P025	F19SP02503	Soil	11/15/00	VOCs, SVOCs
Area 20				
P001	F20SP00111	Soil	1/22/99	VOCs, SVOCs
	F20GP00101	Groundwater	1/29/99	VOCs, SVOCs, Metals
P002	F20SP00206	Soil	1/22/99	VOCs, SVOCs
	F20GP00201	Groundwater	1/29/99	VOCs, SVOCs, Metals
P003	F20SP00308	Soil	1/22/99	VOCs, SVOCs
	F20GP00301	Groundwater	1/29/99	VOCs, SVOCs, Metals
P004	F20SP00403	Soil	1/29/99	VOCs, SVOCs
	F20GP00401	Groundwater	1/29/99	VOCs, SVOCs, Metals
P005	F20SP00511	Soil	1/26/99	VOCs, SVOCs
	F20GP00501	Groundwater	1/29/99	VOCs, SVOCs, Metals
P006	F20SP00606	Soil	1/27/99	VOCs, SVOCs
	F20GP00601	Groundwater	1/29/99	VOCs, SVOCs, Metals
P007	F20SP00719	Soil	1/26/99	VOCs, SVOCs
P008	F20GP00801	Groundwater	1/29/99	VOCs, SVOCs, Metals
P009	F20SP00921	Soil	1/27/99	VOCs, SVOCs
P010	F20SP01002	Soil	1/27/99	VOCs, SVOCs
P012	F20SP01210	Soil	1/27/99	VOCs, SVOCs
P013	F20SP01309	Soil	1/27/99	VOCs, SVOCs
P014	F20SP01404	Soil	1/28/99	VOCs, SVOCs
P015	F20SP01509	Soil	1/28/99	VOCs, SVOCs
P016	F20SP01609	Soil	1/28/99	VOCs, SVOCs

Table 2.6
 Areas 19 and 20
 DPT Soil and Groundwater Samples and Analyses
 Fuel Distribution System

Sample Location	Sample Identifier	Medium	Date Collected	Analyses
P017	F20SP01709	Soil	1/27/99	VOCs, SVOCs
P018	F20GP01801	Groundwater	5/07/99	VOCs, SVOCs
P019	F20SP01906	Soil	5/07/99	VOCs, SVOCs
	F20GP01901	Groundwater	5/07/99	"
P020	F20SP02006	Soil	5/07/99	VOCs, SVOCs
	F20GP02001	Groundwater	5/07/99	"
P021	F20SP02106	Soil	5/07/99	VOCs, SVOCs
P022	F20SP02204	Soil	5/07/99	VOCs, SVOCs
	F20GP02201	Groundwater	5/10/99	"
P023	F20SP02307	Soil	5/07/99	VOCs, SVOCs
P024	F20SP02407	Soil	5/07/99	VOCs, SVOCs
	F20GP02401	Groundwater	5/10/99	"
P025	F20SP02505	Soil	5/07/99	VOCs, SVOCs
	F20GP02501	Groundwater	5/10/99	"
P026	F20SP02608	Soil	5/07/99	VOCs, SVOCs
	F20GP02601	Groundwater	5/10/99	"
P027	F20SP02708	Soil	5/07/99	VOCs, SVOCs
	F20GP02701	Groundwater	5/11/99	"
P028	F20GP02801	Groundwater	5/11/99	VOCs
P029	F20SP02907	Soil	5/07/99	VOCs, SVOCs
	F20GP02901	Groundwater	5/11/99	"
P030	F20SP03005	Soil	5/07/99	VOCs, SVOCs
	F20GP03001	Groundwater	5/11/99	"
P031	F20GP03101	Groundwater	6/24/99	VOCs, SVOCs
P032	F20GP03201	Groundwater	6/24/99	VOCs, SVOCs
P033	F20GP03301	Groundwater	6/24/99	VOCs
P034	F20GP03401	Soil	10/02/00	VOCs, SVOCs
P035	F20SP03501	Soil	10/02/00	VOCs, SVOCs
	F20CP03501	"	"	"
P036	F20SP03603	Soil	9/29/00	VOCs, SVOCs
	F20GP03601	Groundwater	10/03/00	"
P037	F20SP03703	Soil	9/29/00	VOCs, SVOCs
	F20GP03701	Groundwater	10/03/00	"

Table 2.6
 Areas 19 and 20
 DPT Soil and Groundwater Samples and Analyses
 Fuel Distribution System

Sample Location	Sample Identifier	Medium	Date Collected	Analyses
P038	F20SP03803	Soil	10/03/00	VOCs, SVOCs
P039	F20SP03903	Soil	10/03/00	VOCs, SVOCs
P040	F20SP04003 F20GP04001	Soil Groundwater	9/29/00 10/02/00	VOCs, SVOCs
P041	F20SP04103 F20GP04101 F20HP04101	Soil Groundwater "	9/29/00 10/02/00 "	VOCs, SVOCs " "
P042	F20SP04203	Soil	9/29/00	VOCs, SVOCs
P043	F20GP04301	Groundwater	10/03/00	VOCs, SVOCs
P044	F20GP04401	Groundwater	10/02/00	VOCs, SVOCs
P045	F20GP04501	Groundwater	10/03/00	VOCs, SVOCs

Notes:

Area 19 sample P008 was not collected.

Area 20 sample P011 was not collected.

SVOCs = Semivolatile Organic Compounds.

VOCs = Volatile Organic Compounds.

1.4 = Duplicate sample.

Table 2.7
 Areas 19 and 20
 Summary of DPT Soil Analytical Results
 Fuel Distribution System

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Area 19				
Volatile Organic Compounds (μg/kg)				
Acetone	F19SP023	50	NL	NA
	F19SP024	9.5		
Benzene	F19SP006	8	5	Yes
	F19SP012	18		Yes
	F19SP013	26		Yes
Chloroform	F19SP025	11	NL	NA
Ethylbenzene	F19SP006	83	1,260	No
	F19SP012	7,700		Yes
	F19SP013	38		No
	F19SP014	2		No
	F19SP015	300		No
Xylene (Total)	F19SP006	12	42,471	No
	F19SP012	780		No
	F19SP014	3		No
	F19SP020	1		No
Semivolatile Organic Compounds (μg/kg)				
Total Naphthalenes	F19SP001	450	210	Yes
	F19SP006	3,000		Yes
	F19SP012	159,855		Yes
	F19SP013	93,000		Yes
	F19SP014	6,800		Yes
	F19SP015	7,100		Yes
	F19SP016	1,080		Yes
	F19SP020	10,300		Yes
	F19SP023	2,900		Yes
2-Methylnaphthalene	F19SP012	112,855	NL	NA
	F19SP013	75,000		
	F19SP014	6,800		
	F19SP015	5,700		
	F19SP016	920		
	F19SP020	1,200		
	F19SP023	2,900		
Naphthalene	F19SP001	450	210	Yes
	F19SP006	3,000		Yes
	F19SP012	47,000		Yes
	F19SP013	18,000		Yes
	F19SP015	1,400		Yes
	F19SP016	160		No
	F19SP020	9,100		Yes

Table 2.7
 Areas 19 and 20
 Summary of DPT Soil Analytical Results
 Fuel Distribution System

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Semivolatile Organic Compounds ($\mu\text{g/kg}$)				
Benzo(a)anthracene	F19SP001	140	73,084	No
	F19SP004	6,300		No
	F19SP006	1,900		No
	F19SP009	75		No
	F19SP010	56		No
	F19SP012	570		No
	F19SP013	600		No
	F19SP014	2,100		No
	F19SP023	83		No
	F19SP024	205		No
Benzo(b)fluoranthene	F19SP001	110	29,097	No
	F19SP004	5,500		No
	F19SP006	1,800		No
	F19SP009	62		No
	F19SP010	58		No
	F19SP012	390		No
	F19SP014	2,500		No
	F19SP024	200J		No
Benzo(k)fluoranthene	F19SP001	120	231,109	No
	F19SP004	5,600		No
	F19SP006	2,000		No
	F19SP009	54		No
	F19SP010	66		No
	F19SP014	2,400		No
Chrysene	F19SP001	240	12,998	No
	F19SP004	6,300		No
	F19SP006	3,200		No
	F19SP009	120		No
	F19SP010	71		No
	F19SP012	1,200		No
	F19SP013	1,100		No
	F19SP014	3,000		No
	F19SP023	76		No
	F19SP024	220		No
Acenaphthene	F19SP020	1,900	NL	NA
	F19SP023	240		
	F19SP024	140		
Anthracene	F19SP014	910	NL	NA
	F19SP023	100		
	F19SP024	72		
Benzo(a)pyrene	F19SP014	2,400	NL	NA
	F19SP023	52		
	F19SP024	160		

Table 2.7
 Areas 19 and 20
 Summary of DPT Soil Analytical Results
 Fuel Distribution System

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Semivolatile Organic Compounds (µg/kg)				
Benzo(g,h,i)perylene	F19SP014	940	NL	NA
Dibenzofuran	F19SP020	790	NL	NA
	F19SP023	240		
Fluoranthene	F19SP014	4,900	NL	NA
	F19SP020	160		
	F19SP023	300		
	F19SP024	370		
Fluorene	F19SP013	7,100	NL	NA
	F19SP014	1,600		
	F19SP015	720		
	F19SP016	150		
	F19SP020	880		
	F19SP023	540		
Indeno(1,2,3-cd)pyrene	F19SP014	1,000	NL	NA
Phenanthrene	F19SP013	14,000	NL	NA
	F19SP014	5,700		
	F19SP015	1,200		
	F19SP020	1,300		
	F19SP023	710		
	F19SP024	115		
Pyrene	F19SP014	5,900	NL	NA
	F19SP020	100		
	F19SP023	210		
	F19SP024	590		
bis(2-ethylhexyl)phthalate	F19SP015	25	NL	NA
	F19SP016	23		
Area 20				
Volatile Organic Compounds (µg/kg)				
Acetone	F20SP035	82.5	NL	NA
	F20SP037	120		
	F20SP038	30		
	F20SP039	48		
	F20SP040	180		
	F20SP042	110		
Benzene	F20SP014	38	5	Yes
	F20SP023	3		No

Table 2.7
 Areas 19 and 20
 Summary of DPT Soil Analytical Results
 Fuel Distribution System

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Volatile Organic Compounds ($\mu\text{g/kg}$)				
Ethylbenzene	F20SP014	11	1,260	No
	F20SP024	1		No
	F20SP041	1		No
Methylene chloride	F20SP038	3	NL	NA
Toluene	F20SP014	1	1,622	No
	F20SP021	2		No
	F20SP030	2		No
Xylene (Total)	F20SP001	1	42,471	No
	F20SP014	13		No
	F20SP023	5		No
Semivolatile Organic Compounds ($\mu\text{g/kg}$)				
Total Naphthalenes	F20SP001	390	210	Yes
	F20SP003	76		No
	F20SP012	171		No
	F20SP014	41,012		Yes
	F20SP015	79		No
	F20SP017	604		Yes
	F20SP019	624		Yes
	F20SP020	56		No
	F20SP023	660		Yes
	F20SP024	600		Yes
	F20SP029	95		No
	F20SP030	89		No
	F20SP038	88		No
Naphthalene	F20SP001	390	210	Yes
	F20SP003	76		No
	F20SP014	4,000		Yes
	F20SP015	79		No
	F20SP017	260		Yes
	F20SP020	30		No
	F20SP023	660		Yes
	F20SP024	600		Yes
	F20SP029	29		No
	F20SP030	43		No
2-Methylnaphthalene	F20SP012	171	NL	NA
	F20SP014	37,912		
	F20SP015	121		
	F20SP017	344		
	F20SP019	624		
	F20SP020	26		
	F20SP029	66		
	F20SP030	46		
	F20SP038	88		

Table 2.7
 Areas 19 and 20
 Summary of DPT Soil Analytical Results
 Fuel Distribution System

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Semivolatile Organic Compounds ($\mu\text{g/kg}$)				
Benzo(a)anthracene	F20SP001	1,900	73,084	No
	F20SP003	580		No
	F20SP004	60		No
	F20SP005	120		No
	F20SP006	100		No
	F20SP012	190		No
	F20SP014	220		No
	F20SP015	660		No
	F20SP016	1,200		No
	F20SP017	3,900		No
	F20SP019	220		No
	F20SP020	210		No
	F20SP021	200		No
	F20SP022	160		No
	F20SP023	170		No
	F20SP024	40		No
	F20SP025	120		No
	F20SP027	35		No
	F20SP029	95		No
	F20SP030	200		No
	F20SP035	36		No
	F20SP036	38		No
	F20SP037	50		No
	F20SP038	280		No
	F20SP039	64		No
	F20SP041	82		No
Benzo(b)fluoranthene	F20SP001	730	29,097	No
	F20SP003	710		No
	F20SP004	60		No
	F20SP005	95		No
	F20SP006	95		No
	F20SP012	48		No
	F20SP014	220		No
	F20SP015	790		No
	F20SP016	1,200		No
	F20SP017	3,000		No
	F20SP020	100		No
	F20SP021	100		No
	F20SP022	140		No
	F20SP023	79		No
	F20SP024	46		No
	F20SP025	110		No
	F20SP027	41		No
	F20SP029	96		No
	F20SP030	140		No
	F20SP038	210		No

Table 2.7
 Areas 19 and 20
 Summary of DPT Soil Analytical Results
 Fuel Distribution System

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Semivolatile Organic Compounds ($\mu\text{g/kg}$)				
Benzo(k)fluoranthene	F20SP001	590	231,109	No
	F20SP003	560		No
	F20SP004	43		No
	F20SP005	73		No
	F20SP006	81		No
	F20SP012	57		No
	F20SP014	140		No
	F20SP015	720		No
	F20SP016	920		No
	F20SP017	2,800		No
	F20SP020	110		No
	F20SP021	110		No
	F20SP022	140		No
	F20SP023	53		No
	F20SP024	30		No
	F20SP025	120		No
	F20SP027	29		No
	F20SP029	85		No
	F20SP030	170		No
	F20SP038	220		No
Chrysene	F20SP001	3,200	12,998	No
	F20SP003	1,000		No
	F20SP004	64		No
	F20SP005	220		No
	F20SP006	180		No
	F20SP012	250		No
	F20SP013	52		No
	F20SP014	410		No
	F20SP015	740		No
	F20SP016	1,200		No
	F20SP017	3,700		No
	F20SP019	440		No
	F20SP020	220		No
	F20SP021	260		No
	F20SP022	190		No
	F20SP023	310		No
	F20SP024	55		No
	F20SP025	150		No
	F20SP027	45		No
	F20SP029	180		No
	F20SP030	280		No
	F20SP035	44		No
	F20SP036	46		No
	F20SP037	68		No
	F20SP038	350		No
	F20SP039	81		No
	F20SP040	27		No
	F20SP041	89		No

Table 2.7
 Areas 19 and 20
 Summary of DPT Soil Analytical Results
 Fuel Distribution System

Parameters	Location	Subsurface Conc.	Groundwater Protection RBSL	Exceeds Groundwater Protection RBSL
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)				
Acenaphthene	F20SP038	1,400	NL	NA
	F20SP041	48		
Anthracene	F20SP038	550	NL	NA
	F20SP041	54		
Benzo(a)pyrene	F20SP035	31	NL	NA
	F20SP036	44		
	F20SP037	65		
	F20SP038	190		
	F20SP039	74		
	F20SP040	33		
	F20SP041	87		
Benzoic acid	F20SP039	400	NL	NA
Dibenzofuran	F20SP038	630	NL	NA
Fluoranthene	F20SP038	1,200	NL	NA
Fluorene	F20SP038	1,100	NL	NA
Phenanthrene	F20SP035	38	NL	NA
	F20SP038	2,300		
	F20SP041	120		
Pyrene	F20SP038	1,800	NL	NA
	F20SP041	230		

Notes:

NL = Not listed.

NA = Not applicable.

$\mu\text{g}/\text{kg}$ = Micrograms per kilogram.

RBSLs for groundwater protection from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) were used as reference concentrations.

Bolded concentrations exceed RBSLs.

Table 2.8
 Areas 19 and 20
 Summary of DPT Groundwater Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Area 19				
Volatile Organic Compounds (µg/L)				
Benzene	F19GP009	8	5	Yes
	F19GP013	32		Yes
	F19GP014	2		No
Ethylbenzene	F19GP001	1	700	No
	F19GP012	44		No
	F19GP013	40		No
Xylene (Total)	F19GP012	2	10,000	No
	F19GP013	13		No
	F19GP015	2		No
Semivolatile Organic Compounds (µg/L)				
Total PAHs	F19GP004	2.8	25	No
	F19GP009	46		Yes
	F19GP010	2.4		No
	F19GP011	7.8		No
	F19GP012	354,216		Yes
	F19GP013	305		Yes
	F19GP014	133		Yes
	F19GP015	1,551		Yes
	F19GP016	161		Yes
	F19GP017	7		No
	F19GP018	41		Yes
	F19GP019	22		No
	F19GP020	464		Yes
2-Methylnaphthalene	F19GP009	43.6	10	Yes
	F19GP010	1.58		No
	F19GP011	4.84		No
	F19GP012	260,816		Yes
	F19GP013	190		Yes
	F19GP014	130		Yes
	F19GP015	1,300		Yes
	F19GP016	140		Yes
	F19GP017	7		No
	F19GP018	5		No
	F19GP019	10		Yes
	F19GP020	15		Yes

Table 2.8
 Areas 19 and 20
 Summary of DPT Groundwater Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Semivolatile Organic Compounds ($\mu\text{g/L}$)				
Naphthalene	F19GP009	2	10	No
	F19GP010	0.8		No
	F19GP011	3		No
	F19GP012	91,000		Yes
	F19GP013	100		Yes
	F19GP015	240		Yes
	F19GP016	18		Yes
	F19GP018	16		Yes
	F19GP019	12		Yes
	F19GP020	440		Yes
2,4-Dimethylphenol	F19GP020	12	NL	NA
Benzo(a)anthracene	F19GP013	5	10	No
	F19GP014	1		No
	F19GP016	0.8		No
	F19GP018	5		No
	F19GP020	2		No
Benzo(a)pyrene	F19GP013	2	NL	NA
	F19GP014	0.6		
	F19GP018	3		
Benzo(b)fluoranthene	F19GP004	0.8	10	No
	F19GP013	2		No
	F19GP016	0.7		No
	F19GP018	2		No
	F19GP020	2		No
Benzo(k)fluoranthene	F19GP004	1	10	No
	F19GP018	3		No
	F19GP020	2		No
Benzo(g,h,i)perylene	F19GP013	0.8	NL	NA
Chrysene	F19GP004	1	10	No
	F19GP012	2,400		Yes
	F19GP013	8		No
	F19GP014	2		No
	F19GP015	11		Yes
	F19GP016	1		No
	F19GP018	7		No
	F19GP020	3		No
Acenaphthene	F19GP013	24	NL	NA
	F19GP014	8		
	F19GP018	42		
	F19GP019	15		
	F19GP020	32		

Table 2.8
 Areas 19 and 20
 Summary of DPT Groundwater Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Semivolatile Organic Compounds (µg/L)				
Anthracene	F19GP018	10	NL	NA
	F19GP019	1		
	F19GP020	3		
Dibenzofuran	F19GP013	22	NL	NA
	F19GP014	8		
	F19GP015	42		
	F19GP018	17		
	F19GP019	5		
	F19GP020	11		
Fluoranthene	F19GP013	5	NL	NA
	F19GP014	2		
	F19GP018	22		
	F19GP019	1		
	F19GP020	6		
Fluorene	F19GP013	40	NL	NA
	F19GP014	16		
	F19GP015	130		
	F19GP016	20		
	F19GP017	2		
	F19GP018	24		
	F19GP019	7		
	F19GP020	14		
Phenanthrene	F19GP013	73	NL	NA
	F19GP014	28		
	F19GP015	240		
	F19GP016	26		
	F19GP017	2		
	F19GP018	48		
	F19GP019	6		
	F19GP020	20		
Phenol	F19GP013	1	NL	NA
Pyrene	F19GP013	9	NL	NA
	F19GP014	3		
	F19GP016	3		
	F19GP018	17		
	F19GP020	6		
Bis(2-ethylhexyl)phthalate	F19GP013	3	NL	NA
	F19GP014	5		
	F19GP016	1		
	F19GP017	2		
	F19GP018	0.70		
	F19GP019	1		
	F19GP020	2		

Table 2.8
 Areas 19 and 20
 Summary of DPT Groundwater Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Area 20				
Volatile Organic Compound (µg/L)				
Acetone	F20GP036	28	NL	NA
	F20GP045	8		
Benzene	F20GP005	2	5	No
Ethylbenzene	F20GP005	5	700	No
	F20GP008	5		No
Toluene	F20GP005	4	1,000	No
Xylene (Total)	F20GP005	21	10,000	No
	F20GP008	10		No
	F20GP024	4		No
Semivolatile Organic Compounds (µg/L)				
Total PAHs	F20GP001	14	25	No
	F20GP002	1		No
	F20GP003	19		No
	F20GP004	17		No
	F20GP005	53		Yes
	F20GP006	8		No
	F20GP008	1,438		Yes
	F20GP018	7		No
	F20GP022	3		No
	F20GP024	144		Yes
	F20GP025	44		Yes
	F20GP031	16		No
	F20GP037	27		Yes
	F20GP043	577		Yes
	F20GP044	33		Yes
2-Methylnaphthalene	F20GP001	13	10	Yes
	F20GP003	9.6		No
	F20GP004	10.9		Yes
	F20GP005	32.6		Yes
	F20GP006	3		No
	F20GP008	507		Yes
	F20GP018	0.53		No
	F20GP019	4		No
	F20GP020	6		No
	F20GP022	2		No
	F20GP024	127		Yes
	F20GP037	27		Yes
	F20GP043	577		Yes
	F20GP044	33		Yes

Table 2.8
 Areas 19 and 20
 Summary of DPT Groundwater Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Semivolatile Organic Compounds ($\mu\text{g/L}$)				
Naphthalene	F20GP001	1	10	No
	F20GP002	1		No
	F20GP003	3		No
	F20GP004	6		No
	F20GP005	16		Yes
	F20GP006	5		No
	F20GP008	780		Yes
	F20GP018	0.60		No
	F20GP022	1		No
	F20GP024	9		No
	F20GP037	19		Yes
	F20GP043	34		Yes
	F20GP044	6		No
Benzo(a)anthracene	F20GP003	2	10	No
	F20GP005	1		No
	F20GP008	55		Yes
	F20GP018	2		No
	F20GP024	2		No
	F20GP025	15		Yes
	F20GP031	4		No
	F20GP037	1		No
Benzo(a)pyrene	F20GP031	4	NL	NA
	F20GP043	6		NA
Benzo(b)fluoranthene	F20GP003	2	10	No
	F20GP005	1		No
	F20GP008	26		Yes
	F20GP018	1		No
	F20GP024	1		No
	F20GP025	10		No
	F20GP031	4		No
Benzo(k)fluoranthene	F20GP008	20	10	Yes
	F20GP018	0.50		No
	F20GP024	0.90		No
	F20GP025	6		No
	F20GP031	3		No
	F20GP043	6		No
Benzo(g,h,i)perylene	F20GP031	3	NL	NA
	F20GP043	2		
Benzoic acid	F20GP031	2	NL	NA
	F20GP032	1		
	F20GP036	7		
	F20GP045	7		

Table 2.8
 Areas 19 and 20
 Summary of DPT Groundwater Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSLs	Exceeds RBSL
Semivolatile Organic Compounds (µg/L)				
Chrysene	F20GP003	2	10	No
	F20GP005	2		No
	F20GP008	50		Yes
	F20GP018	2		No
	F20GP024	4		No
	F20GP025	13		Yes
	F20GP031	5		No
	F20GP037	2		No
	F20GP043	11		Yes
Acenaphthene	F20GP037	29	NL	NA
Anthracene	F20GP031	2	NL	NA
	F20GP037	6		
	F20GP043	21		
Dibenzofuran	F20GP037	11	NL	NA
Fluoranthene	F20GP031	11	NL	NA
	F20GP037	12		
	F20GP043	29		
Fluorene	F20GP031	0.80	NL	NA
	F20GP037	18		
	F20GP043	44		
Indeno(1,2,3-cd)pyrene	F20GP031	2	NL	NA
	F20GP043	2		
Phenanthrene	F20GP031	5	NL	NA
	F20GP037	28		
	F20GP043	170		
Phenol	F20GP032	0.60	NL	NA
Pyrene	F20GP031	10	NL	NA
	F20GP037	8		
	F20GP043	24		
Bis(2-ethylhexyl)phthalate	F20GP031	2	NL	NA
	F20GP032	2		
Diethylphthalate	F20GP031	0.70	NL	NA
	F20GP032	0.60		
Di-n-butylphthalate	F20GP031	1	NL	NA
	F20GP032	0.50		

Notes:

NL = Not listed.

NA = Not applicable.

µg/L = Micrograms per liter.

RBSLs from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) were used as reference concentrations.

Bolded concentrations exceed RBSL.

Table 2.9
 Areas 19 and 20
 Summary of Monitoring Well Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSL	Shallow Background	Exceed RBSL
Area 19					
Semivolatile Organic Compounds (µg/L)					
Benzoic acid	FDS19A	9	NL	NA	NA
	FDS19B	19			
	FDS19C	6			
	FDS19D	6			
	FDS19E	6			
	FDS19G	8			
bis(2-Ethylhexyl)phthalate	FDS19B	41	NL	NA	NA
Butylbenzylphthalate	FDS19B	1	NL	NA	NA
Di-n-butylphthalate	FDS19A	1	NL	NA	NA
	FDS19B	1			
	FDS19C	1			
	FDS19E	1			
	FDS19F	1			
Inorganics (µg/L)					
Arsenic (As)	FDS19A	13.2	50	17.8	No
	FDS19B	8.2			No
	FDS19C	4.1			No
	FDS19D	17			No
	FDS19E	3.3			No
	FDS19F	20.6			No
	FDS19G	5.2			No
Barium (Ba)	FDS19A	293	2,000	31	No
	FDS19B	217			No
	FDS19C	46.7			No
	FDS19D	42.7			No
	FDS19E	46.2			No
	FDS19F	81.8			No
	FDS19G	32.6			No
Chromium (Cr)	FDS19A	0.73	100	3.88	No
	FDS19B	1.9			No
	FDS19C	2.7			No
	FDS19D	1			No
	FDS19E	1.5			No
	FDS19F	3.1			No
	FDS19G	6.7			No
Lead (Pb)	FDS19C	4.9	15	4.6	No
	FDS19F	3.2			No

Table 2.9
 Areas 19 and 20
 Summary of Monitoring Well Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSL	Shallow Background	Exceed RBSL
Area 20					
Semivolatile Organic Compounds (µg/L)					
Total PAHs	FDS20A	3	25	NA	No
	FDS20C	3			No
2-Methylnaphthalene	FDS20A	3	10	NA	No
	FDS20C	2			No
Naphthalene	FDS20C	1	10	NA	No
4-Chloro-3-methylphenol	FDS20A	1	NL	NA	NA
4-Methylphenol	FDS20B	1	NL	NA	NA
	FDS20C	1			
	FDS20E	8			
4-Nitrophenol	FDS20C	1	NL	NA	NA
Acenaphthene	FDS20A	2	NL	NA	NA
	FDS20C	5			
	FDS20E	1			
	FDS20F	2			
Anthracene	FDS20A	1	NL	NA	NA
	FDS20C	1			
Benzoic acid	FDS20A	1.5	NL	NA	NA
	FDS20B	2			
	FDS20C	1			
	FDS20D	1			
	FDS20E	4			
Dibenzofuran	FDS20C	2	NL	NA	NA
Diethylphthalate	FDS20A	1	NL	NA	NA
Di-n-butylphthalate	FDS20A	1	NL	NA	NA
	FDS20B	1			
	FDS20C	0.6			
	FDS20D	1			
Fluoranthene	FDS20C	1	NL	NA	NA
Fluorene	FDS20C	4	NL	NA	NA
	FDS20F	1			
Pentachlorophenol	FDS20C	1	NL	NA	NA

Table 2.9
 Areas 19 and 20
 Summary of Monitoring Well Analytical Results
 Fuel Distribution System

Parameters	Location	Concentration	RBSL	Shallow Background	Exceed RBSL
Semivolatile Organic Compounds (µg/L)					
Phenanthrene	FDS20A	1	NL	NA	NA
	FDS20B	1			
	FDS20C	7			
	FDS20E	2			
Phenol	FDS20A	1	NL	NA	NA
Pyrene	FDS20A	1	NL	NA	NA
	FDS20C	1			
Inorganics (µg/L)					
Arsenic (As)	FDS20A	5.5	50	17.8	No
	FDS20B	11.3			No
	FDS20C	13.4			No
	FDS20D	3.7			No
	FDS20E	15.8			No
Barium (Ba)	FDS20A	94.55	2,000	31	No
	FDS20B	142			No
	FDS20C	428			No
	FDS20D	79.3			No
	FDS20E	146			No
	FDS20F	45.4			No
Cadmium (Cd)	FDS20C	1.2	5	0.53	No
	FDS20D	0.36			No
	FDS20E	0.89			No
Chromium (Cr)	FDS20A	1.15	100	3.88	No
	FDS20B	2			No
	FDS20C	3.9			No
	FDS20D	2.6			No
	FDS20E	2.4			No
	FDS20F	0.56			No
Lead (Pb)	FDS20B	2.2	15	15.4	No
	FDS20C	3.1			No

Notes:

NL = Not listed
 NA = Not applicable
 µg/L = Micrograms per liter

RBSLs from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) were used as reference concentrations.

Bolded concentrations exceed RBSL.

Table 3.1
 DPT Soil and Groundwater Samples and Analyses
 HFF

Sample Location	Sample Identifier	Medium	Date Collected	Analyses	Purpose
SP001	HFFSP00101	Surface Soil	9/29/00	VOCs, SVOCs	Delineate/confirm petroleum contamination estimated by ESE/KEMRON near tank 3916 and identify potential associated RCRA concerns.
	HFFSP00102	Subsurface Soil	"	"	
GP001	HFFGP00101	Groundwater	10/02/00	"	
SP002	HFFSP00201	Surface Soil	9/29/00	VOCs, SVOCs	Delineate/confirm petroleum contamination estimated by ESE/KEMRON near tank 3916 and identify potential associated RCRA concerns.
	HFFSP00202	Subsurface Soil	"	"	
SP003	HFFSP00301	Surface Soil	1/21/99	VOCs, SVOCs	Delineate/confirm petroleum contamination estimated by ESE/KEMRON near tank 3916 and identify potential associated RCRA concerns.
	HFFSP00302	Subsurface Soil	4/12/99	"	
SP004	HFFSP00401	Surface Soil	9/29/00	VOCs, SVOCs	Screen for/confirm petroleum contamination and identify potential RCRA concerns associated with tank 3900E.
	HFFSP00402	Subsurface Soil	"	"	
GP004	HFFGP00401	Groundwater	10/01/00	"	
	HFFHP00401	"	"	"	
SP005	HFFSP00501	Surface Soil	9/29/00	VOCs, SVOCs	Screen for/confirm petroleum contamination and identify potential RCRA concerns associated with tank 3900E.
	HFFSP00502	Subsurface Soil	"	"	
SP006	HFFSP00601	Surface Soil	9/28/00	VOCs, SVOCs	Screen for petroleum contamination and identify potential RCRA concerns associated with tank 3900F.
	HFFCP00601	"	"	"	
	HFFSP00602	Subsurface Soil	"	"	
	HFFCP00602	"	"	SVOCs	
GP006	HFFGP00601	Groundwater	10/01/00	VOCs, SVOCs	
SP007	HFFSP00701	Surface Soil	9/29/00	VOCs, SVOCs	Screen for petroleum contamination and identify potential RCRA concerns associated with tank 3900F.
	HFFSP00702	Subsurface Soil	"	"	
SP008	HFFSP00801	Surface Soil	9/28/00	VOCs, SVOCs	Delineate/confirm petroleum contamination estimated by ESE/KEMRON near tank 3917 and identify potential associated RCRA concerns.
	HFFSP00802	Subsurface Soil	"	"	
SP009	HFFSP00901	Surface Soil	9/28/00	VOCs, SVOCs	Delineate/confirm petroleum contamination estimated by ESE/KEMRON near tank 3917 and identify potential associated RCRA concerns.
	HFFSP00902	Subsurface Soil	"	"	

Table 3.1
 DPT Soil and Groundwater Samples and Analyses
 HFF

Sample Location	Sample Identifier	Medium	Date Collected	Analyses	Purpose
SP010	HFFSP01001	Surface Soil	9/28/00	VOCs, SVOCs	Delineate/confirm petroleum contamination estimated by ESE/KEMRON near tank 3917 and identify potential associated RCRA concerns.
	HFFSP01002	Subsurface Soil	"	"	
GP010	HFFGP01001	Groundwater	10/01/00	"	
SP011	HFFSP01101	Surface Soil	11/15/00	VOCs, SVOCs	Delineate soil contamination associated with sample HFFSP00802.
	HFFSP01102	Subsurface Soil	"	"	
GP011	HFFGP01101	Groundwater	10/01/00	VOCs, SVOCs	Identify potential petroleum/RCRA groundwater contamination south of ESE/KEMRON area.
SP012	HFFSP01201	Surface Soil	11/15/00	VOCs, SVOCs	Delineate soil contamination associated with sample HFFSP00802.
	HFFSP01202	Subsurface Soil	"	"	
GP012	HFFGP01201	Groundwater	10/02/00	VOCs, SVOCs	Identify potential petroleum/RCRA groundwater contamination northwest of tank 3900E.
SP013	HFFSP01301	Surface Soil	11/15/00	VOCs, SVOCs	Delineate soil contamination associated with sample HFFSP00802.
	HFFSP01302	Subsurface Soil	"	"	
GP013	HFFGP01301	Groundwater	10/01/00	VOCs, SVOCs	Identify potential petroleum/RCRA groundwater contamination southwest of tank 3900F.
SP014	HFFSP01401	Surface Soil	11/15/00	VOCs, SVOCs	Delineate soil contamination associated with sample HFFSP00802.
	HFFSP01402	Subsurface Soil	"	"	

Notes:

SVOCs = Semivolatile Organic Compounds
 VOCs = Volatile Organic Compounds
 * = Duplicate sample

Table 3.2
 Summary of DPT Soil Analytical Results
 HFF

Parameters	Location	Surface Conc.	Subsurface Conc.	Dermal Protection RBSL	GW Protection RBSL	RBC	SSL
Volatile Organic Compounds (µg/kg)							
Acetone	HFFSP004	2700D	ND	NL	NL	780000	5700
	HFFSP009	92	ND				
	HFFSP011	15	ND				
	HFFSP012	ND	5				
	HFFSP013	13	6				
	HFFSP014	ND	6				
Chlorobenzene	HFFSP008	ND	10	NL	NL	NA	1900
Ethylbenzene*	HFFSP002	ND	2J	780000	1260	NA	21000
Methylene Chloride	HFFSP001	4J	ND	NL	NL	85000	12
	HFFSP005	ND	4J				
	HFFSP006	9	ND				
Semivolatile Organic Compounds (µg/kg)							
Total Naphthalenes*	HFFSP006	1915 ^b	ND	310000	210	NL	NL
	HFFSP008	ND	7200 ^b				
2-Methylnaphthalene*	HFFSP006	810J	ND	NL	NL	160000	73000
	HFFSP008	ND	3000D				
Naphthalene*	HFFSP006	1105 ^b	ND	3100000	210	160000	120000
	HFFSP008	ND	4200D ^b				
Benzo(a)anthracene*	HFFSP002	ND	75J	880	73,084	870	3900
	HFFSP003	ND	78J				
	HFFSP004	13000 ^a	31J				
	HFFSP005	830	ND				
	HFFSP006	15450 ^a	ND				
	HFFSP007	2100D ^a	ND				
	HFFSP008	26J	9500D				
Benzo(b)fluoranthene*	HFFSP004	12000 ^a	ND	880	29,097	870	12000
	HFFSP005	660	ND				
	HFFSP006	17330 ^a	ND				
	HFFSP007	1400 ^a	ND				
	HFFSP008	ND	11000D				
Benzo(k)fluoranthene*	HFFSP004	8700 ^a	ND	880	231,109	8700	120000
	HFFSP005	740	ND				
	HFFSP006	8770 ^a	ND				
	HFFSP007	1700D ^a	ND				

Table 3.2
 Summary of DPT Soil Analytical Results
 HFF

Parameters	Location	Surface Conc.	Subsurface Conc.	Dermal Protection RBSL	GW Protection RBSL	RBC	SSL
Semivolatile Organic Compounds (µg/kg)							
Chrysene*	HFFSP002	ND	136J	880	12,998	87000	1390000
	HFFSP003	ND	89J				
	HFFSP004	13000 ^a	33J				
	HFFSP005	850	ND				
	HFFSP006	13930 ^a	ND				
	HFFSP007	2100D ^a	ND				
	HFFSP008	28J	8500D				
	HFFSP009	ND	45J				
Dibenz(a,h)anthracene*	HFFSP004	1200J ^a	ND	88	87886	87	3700
	HFFSP006	1200 ^a	ND				
	HFFSP007	210J ^a	ND				
	HFFSP008	ND	1400				
Acenaphthene	HFFSP002	ND	66J	NL	NL	47000	1300000
	HFFSP004	1560	ND				
	HFFSP005	62J	ND				
	HFFSP006	3860	ND				
	HFFSP007	280J	ND				
	HFFSP008	ND	8800D				
Acenaphthylene	HFFSP006	300J	ND	NL	NL	160000	190000
	HFFSP008	ND	290J				
Anthracene	HFFSP004	4590	ND	NL	NL	230000	2.6E+07
	HFFSP005	260J	ND				
	HFFSP006	810	ND				
	HFFSP007	990D	ND				
	HFFSP008	ND	6300D				
Benzo(a)pyrene	HFFSP002	ND	62J	NL	NL	87	17000
	HFFSP003	ND	78J				
	HFFSP004	11000	ND				
	HFFSP005	770	ND				
	HFFSP006	10850	ND				
	HFFSP007	1600	ND				
	HFFSP008	ND	7400D				
	HFFSP013	ND	110J				
Benzo(g,h,i)perylene	HFFSP004	3800J	ND	NL	NL	160000	2.3E+07
	HFFSP005	300J	ND				
	HFFSP006	4720	ND				
	HFFSP007	780	ND				
	HFFSP008	ND	4600D				
Benzoic acid	HFFSP004	ND	420J	NL	NL	310000	230000
	HFFSP006	260J	260J				
	HFFSP009	ND	410J				
bis(2-Ethylhexyl)phthalate	HFFSP006	180J	ND	NL	NL	46000	740000

Table 3.2
 Summary of DPT Soil Analytical Results
 HFF

Parameters	Location	Surface Conc.	Subsurface Conc.	Dermal Protection RBSL	GW Protection RBSL	RBC	SSL
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)							
Dibenzofuran	HFFSP006	2690	ND	NL	NL	31000	27000
	HFFSP007	140J	ND				
	HFFSP008	ND	5000D				
Di-n-butylphthalate	HFFSP011	340J	ND	NL	NL	780000	1.0E+07
	HFFSP014	ND	110J				
Fluoranthene	HFFSP004	27000	ND	NL	NL	310000	1.3E+07
	HFFSP005	1500	ND				
	HFFSP006	36550	ND				
	HFFSP007	4000D	ND				
	HFFSP008	ND	24000D				
Fluorene	HFFSP004	1700J	ND	NL	NL	310000	1700000
	HFFSP005	70J	ND				
	HFFSP006	5255	ND				
	HFFSP007	360J	ND				
	HFFSP008	ND	8400D				
Indeno(1,2,3-cd)pyrene	HFFSP004	4800	ND	NL	NL	870	34000
	HFFSP005	360	ND				
	HFFSP006	4855	ND				
	HFFSP007	900	ND				
	HFFSP008	ND	3600D				
Phenanthrene	HFFSP003	ND	47J	NL	NL	230000	2700000
	HFFSP004	14000	ND				
	HFFSP005	670	ND				
	HFFSP006	34050	ND				
	HFFSP007	3000D	ND				
	HFFSP008	70J	31000D				
Pyrene	HFFSP002	ND	1100	NL	NL	230000	9400000
	HFFSP004	20000	ND				
	HFFSP005	1600	ND				
	HFFSP006	25200	ND				
	HFFSP007	4200D	ND				
	HFFSP008	ND	22000D				

Notes:

NL = Not listed

NA = Not applicable

$\mu\text{g}/\text{kg}$ = Micrograms per kilogram

RBSLs for groundwater protection from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) were used as reference concentrations.

Bolded concentrations exceed RBSLs (a = exceeds dermal protection RBSL; b = exceeds groundwater protection RBSL).

*Denotes regulated fuel constituent.

Table 3.3
 Summary of DPT Groundwater Analytical Results
 HFF

Parameters	Location	Concentration	RBSL ($\mu\text{g/L}$)	Tap Water RBC ($\mu\text{g/L}$)	MCL ($\mu\text{g/L}$)
Volatile Organic Compound ($\mu\text{g/L}$)					
1,2-Dichloroethene (total)	HFFGP010	21	NL	5.5	5
Methylene Chloride	HFFGP001 HFFGP011	3J 3J	NL	4.1	5
Semivolatile Organic Compounds ($\mu\text{g/L}$)					
Benzoic acid	HFFGP012	11	NL	15000	NL
Semivolatile Organic Compounds ($\mu\text{g/L}$)					
Bis(2-ethylhexyl)phthalate	HFFGP006 HFFGP013	6J 6J	NL	4.8	6

Notes:

NL = Not listed.

RBSL = Risk-based Screening Level from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998).

Tap water

RBC = USEPA Region III Tap Water Risk-Based Concentration (THQ=0.1).

MCL = USEPA Maximum Contaminant Level.

$\mu\text{g/L}$ = Micrograms per liter.